THE WORLD About Us

A Study in Geographical Environment

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I

Outlines

THE term 'geographical environment', in relation to man, covers all those features of the land in which he lives, in respect of their effects upon his habit of life in whatever connexion. Such features include the relief of the land, whether it be plain, hilly, or mountainous; the nature of its soil, whether fertile or unfertile, well watered or dry; its position, whether insular or continental, and if continental whether coastal or inland; its relation to other lands surrounding it; its climate, vegetation, and mineral wealth. All such features influence man more or less in his social and political condition, in his economic activities, even in his mental and physical development. These influences are in many cases obvious—sometimes so obvious that their importance is apt to be overlooked: for that very reason they are worth viewing systematically as a necessary part of the study not only of geography itself, but of history and economics. In other cases they are subtle and indirect, and there comes a point when they may be supposititious or at least incapable of reasoned proof; as, for example, when it is attempted to assess the influence of climate upon character.

There are two ways of approaching our subject: the one, to take special instances, and follow them up to generalized statements; the other, to state the generalizations and then attempt to apply them. The first is the ideal method. But it would be impossible of achievement within the limits of a short survey like

the present; moreover, the whole subject is not, by far, in a condition to make the application of this method possible. The study of geographical environment is in its infancy. In its maturity, it connotes the collection of every fact in geography and allied subjects which bears in any way upon human activity: the collection of so vast a body of facts and the critical consideration of them, in order that their bearing may be assessed at its proper value, must represent the efforts of generations of workers, each in his chosen field. The alternative is to set out general statements and examine them, using caution, and if this short book, in setting out such statements, merely suggests lines of examination, it fulfils its only possible purpose in so wide a field; for the field is world-wide.

Geographical environment, to a greater or less extent, affects man's movement and settlement, his social, political, and economic status, his mind and his body. In relation to the first, we have to consider natural lines of communication and natural barriers, and the scale of man's achievement in making use of them or overcoming them. In connexion with his social and political position in the human scale, such questions are involved as those of the position and physical condition of his territory—whether it be isolated or accessible and open to external influences, so that his outlook be limited or extensive; whether, again, it be naturally strong or open to attack by enemies; whether it offer a variety of surface and other physical conditions, or a monotony, such as may either expand or restrict his interests. The effects of geographical environment upon man's economic development have come to form the basis of one of the most important, because one of the most practical, departments of geography (especially as an educational subject): in fact, this study represents the contribution of geography to the union of subjects implied in the term economic geography, while the complement to the union comes from the side of economics.

At various points the considerations outlined in the preceding paragraph dovetail with the effects of geographical environment upon man's mentality—the psychological effects : the psychology of a nation, for instance, expresses itself freely, on occasion, and through individuals or collectively, in such directions as territorial expansion, or commercial dealings, or others which are directly or indirectly affected by environment.

Apart from these, there are such effects as are sometimes so powerfully exercised by the homeland, its character and scenery, upon a people's literature and (less palpably but still explicitly) its music, its superstition and religion. With these aspects the practical geographer has little to do directly, but he may be glad of the geographical knowledge which enables him more fully to appreciate the descriptive writings, let us say, of Robert Louis Stevenson, or the music of Scandinavia, or the Irish folk-songs. And he will recognize incidentally the geographical origin of many a tradition, many a factor in religious tenets. He may (for example) associate the origin of the Jewish hell with the existence of the burning Syrian desert bordering the home of the Jewish faith. And he may note that Christianity found in the lands over which it spread no natural phenomenon of outstanding horror which might be substituted for the Jewish conception.

There is a very large field for study in the physical influence of geographical environment ; but it is not, as a rule, for the geographer to take the initiative here. He can only supply data to the physiologist or the anthropologist, who is at work on such questions as the effects of severe climate on man's bodily development, that of heat or light on the colour of the skin, that of the distribution of diseases (especially tropical) and the like. The distribution of malaria is ultimately a result of geographical environment, but the geographer's duty stops at supplying maps for recording it and the breeding-places of the carrying mosquito. The geographer, again, is not concerned with the

physical process of acclimatization when men move from one environment to another—from mountain to plain, from temperate to tropical conditions, for example. But he may be very much concerned with the result of that process, as we shall see later.

A complete geographical survey of any particular area must take account of all these aspects of human life and activity in so far as they are affected by geographical conditions, and must borrow the requisite data, assuming that they exist, from the kindred departments of science concerned (compare Chap. 7). But the aspects more pertinent to world-geography are those concerned with movement, settlement, and occupation—the political and economic aspects (broadly considered), and to these we must confine ourselves here.

The strongest influences of geographical environment are generally of a primitive order, and operate most powerfully upon primitive man. It might for instance be stated that the Eskimo of the Arctic, the pygmy of the equatorial forest, is each, in habit of life, the product exclusively of his geographical environment. Eskimo and pygmy stand (in a geographical sense) at opposite extremities of the human scale. The one fights nature throughout his life: he is at constant strife with his environment. The Arctic climate limits him to animal food which must be arduously hunted; restricts his clothing to skins and his building-material to snow-blocks; makes his country unproductive, and breeds in him an ingenuity in withstanding, aided only by the slenderest resources, the rigours of his environment. The primitive Central African, on the contrary, is kept under the control of his wholly different environment in a wholly different way. He need not fight against it: need not clothe himself against the hot climate, nor build any but the simplest shelter, having the cover of his forest, which also grows him food without requiring his labour. His environment in this way restricts his advancement by pro-

viding for his needs: only, perhaps, in the art of self-protection does he show developed skill.

But between these extremes there is the whole range of peoples, civilized, half-civilized, uncivilized, who are not to an extent equal with our Eskimo or our pygmy subordinated to their geographical environment. In truth we must try to avoid falling anywhere into the error of attributing too powerful or exclusive an influence to geographical environment. There is a dangerous type of geographical statement which runs in this way: 'The British have founded an empire overseas because their home is in a group of islands situated in the centre of the land-hemisphere. . . .' That amounts to worshipping geographical environment as a fetish. Some of the many conditions precedent to the foundation of the British Empire were certainly geographical, as we shall presently see: some, but by no means all.

But granting that, we do not suggest that man, as he advances in civilization, necessarily becomes less dependent on his environment. The primitive peoples such as we have instanced, or, a step higher, the pastoral nomads of some of the regions intermediate between arctic lands and hot forests, are affected in respect of their whole habit of life by certain simple and fundamental conditions of environment. So, clearly, are the purely agricultural peoples. But where these, or industrial peoples who represent the highest grade of civilization, find it possible to settle most densely, and to form the most powerful communities, there must be certain special geographical conditions to enable them to do so, and these bear no large proportion in area to that of the whole land-surface of the earth. Under these conditions, man may overcome to a greater or less extent the primitive phenomena of environment such as limit the activities or movements of less highly developed peoples; but instead he comes under the influences of a wider circle of geographical phenomena. He has advanced, it is true, from what has been termed the

natural to the artificial basis of subsistence, in the sense that his arts are more numerous and more effectively applied, but he is applying them all the time to making an even wider use of the gifts of the earth, in the cultivation of plants, the working of minerals, or whatever other direction. Thus at first he uses the sea as a highway and his own strength to row his boat: then he uses the winds to drive his ship over that highway: then, becoming independent of the winds (or nearly) he uses coal or oil to fire the engines which he builds of the metals he has learnt to win and work.

If further evidence be needed of the dependence of civilized man on his environment, it is found, on broad lines, in the manner in which, at one stage, a state may reach a dominant position among its fellows, but at a later stage may lose that position. Mediterranean history is commonly invoked to illustrate this. For instance, under the conditions of culture when Greece became the seat of powerful and dominating states, the geographical conditions—the central position of the Grecian peninsula in the Eastern Mediterranean, the ease of sea-communications, and the mountainous nature of the country, tempting its inhabitants to look seaward rather than landward—certainly helped these states to develop that culture highly. As certainly, the geographical conditions of Greece—its position off the great main lines of modern communication, its relative poverty in mineral wealth, and so on—do not fit it for the seat of a first-class modern European Power.

The individual may, if he be so minded, amuse himself by considering the points at which geographical environment affects him personally. He is a city worker, let us say: the existence in his city of the industry that employs him may be dictated by environment—if, for example, it be based upon some raw material obtained in the locality, or even formerly obtained in the locality, so that the industry has persisted, though the material, exhausted

locally, be now transported to the place where the industry persists. (The influences of geographical environment sometimes outlive the conditions.) He lives in a house of brick, let us say: building-stone is not cheap in the locality. The house is outside the city, let us say: he seeks a geographical environment for his home pleasanter than that in which he has to work. On his holiday he looks for a change of environment: the city is inland; he goes to the seaside: it is on a plain; he goes to the hills. All this is elementary and obvious, but it is from that sort of premisses that we build up a collective view of the influence of environment on communities: we realize it better in the wide aspect by realizing how obvious it is (when we come to think of it) when applied to ourselves.

2

Factors in Geographical Environment

UNDER the title of this chapter we propose to group leading types of physical features and consider certain points in their influence upon man. We cannot lay down at the outset that the same features will always exercise the same influence—far from it. Herein lies the principal difficulty against presenting the subject methodically on broad lines—that we do not find one single geographical feature exercising control to the exclusion of others. Instead, the influences of two or more work together to produce a general effect. As a simple case: the environment of a mountain home produces certain common characteristics the world over, but these may be modified or overlaid by the results of varying climatic conditions, or by the different natures of adjacent lands; so that one set of mountaineers may stick to their home and isolate themselves, while another may be prone to look abroad for better conditions, and be inspired to raiding or migration. In such cases there must be some feature to be regarded as basic or controlling in the sense that any modification of the results of other features is due to it; and, in this sense, climate appears to be the fundamental factor in geographical environment.

Climate controls the natural vegetation of the Earth, and dictates to man what crops (if any) he may, and what he may not, cultivate. Broadly speaking, unfavourable climatic conditions override favourable conditions of soil more often than the second overrides the first. Climatic conditions largely control the distribution of wild animal life, and similarly influence man by determining what his chief domestic animals shall be, and whether

they shall be his prime source of livelihood, as in the case of the reindeer of the Eurasian arctic peoples, and the various animals of the pastoral peoples of drier plains or hill-country ; or whether they shall be to him a care only equal or secondary to his cultivated crops. These considerations depend upon the two conditions of temperature and precipitation ; but the influences of both extend much farther.

We have in the first chapter hinted at the influence of climate upon man's mentality ; this influence cannot be doubted even if it cannot be actually measured. Temperature is the dominating climatic feature here. We can draw contrasts, for instance, between lands where the climate is respectively varied or monotonous : it is long odds that the interests of the inhabitants will be varied or monotonous in sympathy, and their standard of mental development higher in the one case, moderate or low in the other. We can draw contrasts between the volatile, excitable temperament of man under the genial Mediterranean sun (tending toward lethargy when that sun becomes something more than genial), and the staid northerner of the Baltic lands, influenced by conditions of climate less soft and, if they may be so described, less gaily coloured. We may apply the same comparison to such a more homely comparison as that between the characters of a village in gentle Devonshire and one in the bleak uplands of Yorkshire—to the detriment of neither, but to the revelation of obvious differences.

The amount of precipitation is to be directly associated with such matters, bearing upon the activities of man, as the growth or absence of trees and the amount of vegetation generally. The availability of water for irrigation works where local rainfall is deficient may depend on the precipitation in some distant area whence the water is conveyed by rivers and distributed by canals, as in Egypt, Mesopotamia, and parts of India (Chap. 3). But more than this : upon rainfall depends, directly or ultimately, the

whole question of water-supply in whatever connexion, whether for agriculture, or for power, or for the common uses of daily life. As regards certain cultivated plants, notably wheat, not only the amount but the season of rainfall becomes of capital importance, inasmuch as in some lands wheat can be grown with a very low mean annual rainfall, because the rain season is at the right time for the crop.

Australia supplies a striking example of this condition. In south-eastern Australia the western limit of the belt in which wheat can be profitably grown coincides very closely with the mean rainfall of 10 inches during the winter (April–October). The precipitation in September and October, when the grain is filling, is of prime importance. On the other hand, the wet coastal belt has no great amount of wheat-growing, and the limiting influence of the 20-inch line of winter rainfall is seen on Fig. 1 herewith.[1]

These fundamental influences of climate indicate that the whole régime and scale of civilization is closely controlled by it, subject to other, incidental, influences. And if we assume the original cradle of man to have been in some Asiatic land where natural conditions then existing afforded him an easy primitive way of life, we may trace him as reaching an early high measure of civilization in lands on the edge of his first ready-made home, where less easy conditions compelled him to work and develop arts, as in the Mediterranean lands on the one hand, and eastern Asia on the other. Later the centres of highest development shift so as to come under more temperate climatic conditions, as in western Europe and Britain on the one hand (with all the settlements thence planted overseas), and Japan on the other. Under these conditions the output of man's energy and inventive power is most steadily maintained, and his adaptability most adequately

[1] After Griffith Taylor, *Australia in its Physiographic and Economic Aspects*, Oxford, 1919.

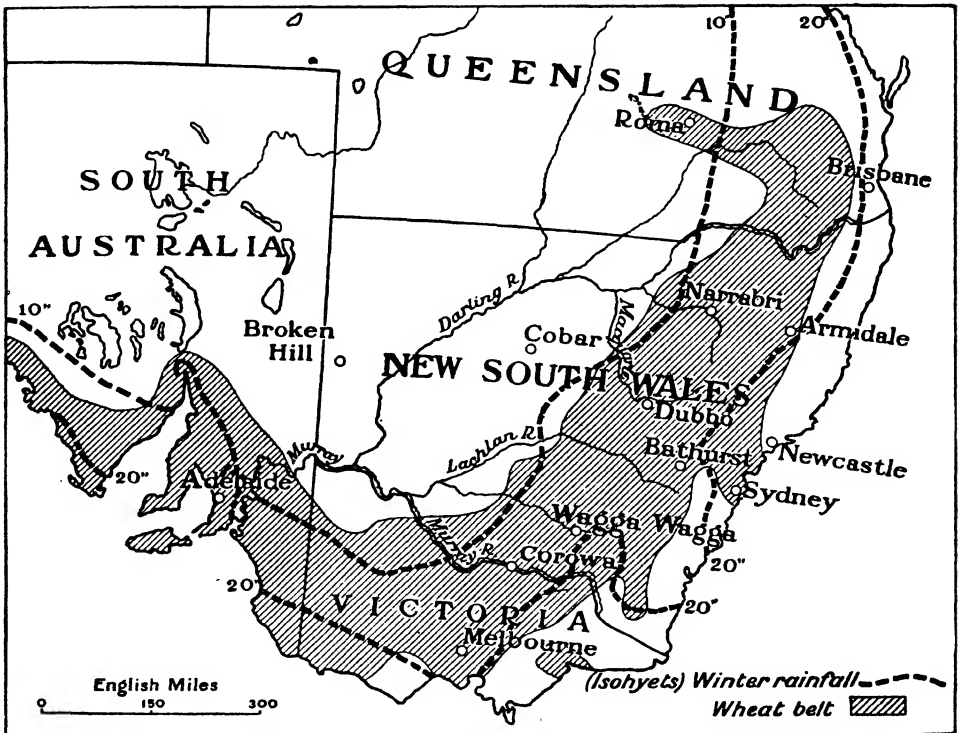

Fig. 1. THE WHEAT BELT IN SOUTH-EASTERN AUSTRALIA

nurtured. A measure of variety in climate is necessary to this end. In a land where it is ' always afternoon ' there is every temptation simply to eat the lotus : on the other hand, a very severe climate absorbs man's energy too much in fighting against it to allow him the free exercise of his faculties in other directions.

Thus far we have been thinking in terms of general conditions, and in the study of climate as part of geography we are accustomed to deal with averages ; but we must not wholly neglect the extremes between which the averages lie. This precaution is hinted at in the distinction we have drawn between monotonous and varied climates ; but there is a farther step to take. Our own climate is not monotonous—far from it—but it does not run to such extremes as fundamentally to affect our life and ways from one season to another. But under an ' extreme ' climate that may happen. There is, for instance, the case of central Russia, with its hard winters when agriculture becomes impossible and ' the people take to home industries ; certain villages or districts become noted for certain particular manufactures, and at last factories for these special industries are established. . . . But the people still go back to their agriculture in summer, and the factories stand idle '.[1]

Again, a comparison of the industrial areas of western Europe (including Britain) and eastern North America shows that the first lies practically all on the warm side of the January isotherm of 32° F., while the second, in the northern part, has a far colder winter than this. The July isotherm of 70° runs south of the European industrial area but north of the American. The major manufacturing industries of western Europe are not materially affected by climatic extremes ; but in America the greater extremes have important economic effects—such as the diversion of traffic from the frozen St. Lawrence ports to the ice-free harbours of the Atlantic seaboard in winter ; and (at the other

[1] *Commercial Geography of the World*, Oxford, 2nd ed., p. 166.

end of the scale) the marked diminution of production which is said to occur in the metal-works of Alabama under the summer heat on the southern margin of the great American industrial region.

As a corollary to the ideas outlined in the previous paragraph there follows this lesson which is to be drawn [1] from the relative position of isotherms on the map. Where they run wide apart, they indicate a wide region of monotonous climate which more or less, according to degree, forces the use of monotones (so to write) in shaping their lives, upon men who live under its influence. Where the successive isotherms run close, indicating a comparatively short distance from a cold through a temperate to a hot region, with the consequent opportunity for quick communication between them, there man's 'historical development', as Miss Semple calls it, is speedy,—and she instances the rapid rise to economic prosperity and political autonomy of the colonies of eastern North America, which has close at hand (as distance is accounted in modern commerce) every sort of natural product that is under climatic control, from the coniferous timber of the cold north lands to the cotton and tropical products of the southern states and the West Indies. We may add one of our own homely little examples (little at least by comparison). The mild springs of the Scilly and Channel Islands with their maritime climate, befalling while the gardens around London and other near centres of population are still wintering, turned the islanders to the cultivation of early flowers and vegetables to supply the greater markets within easy reach.

We pass naturally from the consideration of climate to that of the great regional divisions classified in terms of natural vegetation, which depends so largely on climate. At these we must look more closely in our regional survey in the following chapter, but a few preliminary remarks upon the forest-environment and the grassland-environment are due here.

[1] As Miss Semple shows in *Influences of Geographic Environment*, p. 618.

The relations between man and a forest-environment seem rather curiously unfavourable, if we think merely of the effect wrought upon our minds by the infinite physical beauties of most types of forest. Fine scenery loses much of its charm, for many eyes, if it be bare of woodland. The coniferous forests of the north are monotonous, but (as has been said many a time) with the ceaselessly changing monotony of the sea; and that is a high compliment. The grey-green Australian bush of eucalyptus is even sombre, but few deny its beauty. The gentle variety of deciduous woodlands is infinitely attractive. And so with every type of forest up to the maze of tropical vegetation, beauty of one quality or another is never wanting. But the forest does not offer easy passage to man in migration or colonization; nor, as he advances in culture, does it offer him (or at least any large number of him) a home. His instinct is to destroy it, whether for fuel and building-material, or because he must have land clear for cultivation, or because (at a later stage) he wishes to trade in its products—whatever they be, from the timber and pulp of the coniferous forests to the rubber or other wealth of the tropical. In some lands he does more good than harm: in the course of ages he has changed much of the face of Europe by the destruction of the deciduous woods and their replacement by rich agricultural lands and flourishing villages and towns. But in other cases he destroys too fast or too completely, and Nature retaliates. In many lands—our own, for example, and parts of the Mediterranean countries, and of North America, and of India—she cannot make good his destruction unaided, and he must put in hand laborious schemes of afforestation. Or if he do not, there may be left (as in parts of Italy) no trees to retain the seasonal rainfall and feed it slowly to the land, so that it runs off in floods, which wash away the good soil from the upper slopes, and settle into marshes in the lowlands. In fact, except at man's most primitive stage, of which we have found an instance in the previous

chapter, the forest-environment always, in one way or another, offers a strong element of opposition. The very next step above the primitive forest-dweller brings us to people who live in clearings on its edge, or (as on some of the rivers of south-eastern Asia) are driven by the dense vegetation off the land into floating homes or dwellings built on piles above the water.

Of the big grasslands of the world it may be said, broadly, that while they provide for their inhabitants a wide range of movement, they do not, at least in the first instance, induce a wide outlook upon affairs. As for movement, any farmer, even upon a small patch of the most intensively cultivated land, has a free range in comparison with the average worker in a manufacturing industry. His life is more solitary, more self-centred. The stock farmer has a wider area than the cultivator; progressively so up to the wandering nomad who moves with his animals over the drier steppes in search of pasture. The nomad supplies perhaps the commonest elementary example of the influence of geographical environment: the form of the environment is simple, his dependence upon it is obvious and complete, and he himself, considered in the mass, forms numerically and (more notably) in extent of distribution a not unimportant class of humanity. Of his range, as a class, we must form some idea in the next chapter. Meanwhile, take any one example of him—the wandering Arab, for instance, the romantic 'Beduin of the desert'—and we find generally that his development is arrested at a pretty early stage, unless under some special circumstances. A nomad group, in an arid land particularly, may increase numerically beyond the capacity of its own land to support it: then, if native genius or instinct be strong enough, it overflows as a geyser does its basin. The Arab did that; with what tremendous effects his history shows in the seventh and following centuries, from the time of Mohammed onward. Alternatively, the impulse to high development and wide outlook among dwellers on the grasslands must

come from outside; and that external influence can only take effect if the land itself offers easy cultivation or a sufficiency of grass to support flocks and herds beyond the needs of the inhabitants. Such developments are found in the grasslands of North America and South America, of Australia and South Africa, and of the better parts of the steppe lands of Europe, where wheat is grown, or cattle or sheep are reared, for the supply in bulk, under modern conditions, of densely populated manufacturing districts like our own whose food-supplies are not produced all from their own fields.

The mountain-dweller is isolated from his fellows in the next valley. His environment shuts him off in the first instance from external influences, and tends to keep him politically separate. Switzerland is minutely divided into cantons and communes: its people have no common language, being marked off into those who speak German or French or Italian according to their geographical relationships; even ancient dialects, Romansch and Ladin, are preserved, although now, for the most part, artificially. Switzerland was only driven to form itself into a political unit—a republic—by the external influence of fear lest the strong Powers surrounding its territory should encroach upon it. But for this fear, the Swiss Alps might have been the home of independent little communes now, each in its own valley under little or no common authority; just as mountainous Albania still is, that remotest and least approachable of Balkan—indeed of European—lands, in which a people more ancient than any of its neighbours still maintains itself with little attempt at union or concerted effort. (See further, Chap. 6.)

But the mountain-dweller, confined though he may be by the steep slopes of a valley, is not necessarily of a sedentary habit. The combined influence of climate and elevation may compel him to move about between one season and another, somewhat as the nomad does in the drier plains, but on a more regular

route. The pastoral mountain-dwellers commonly have their head-quarters low in the valley, and they and their herds spend the winter there; but for the summer some members at least of each family take their animals away to an upland farm to use the pasture there in the open season. So they have two seasonal establishments, as in the case of the Norwegian farmer with his real homestead down by the fiord or lake-side and his summer mountain-hut or *sæter*: sometimes even three, as in parts of the Alps, where there are the valley farmsteads, the subsidiary dwellings on the spring meadows (*Mayen*), and the huts on the high pasture or *alp* which is grazed later in the year.

The mountain-dweller, then, commonly has an instinct for movement, induced by the necessities of his environment, and that instinct is made stronger when he knows that beyond his mountain-region lies a plain where the land is richer and crops and animals are fatter than his own. So our hillman has the instinct to become a raider, and in many parts of the world he acts on that instinct, or has done so in the past. Our own highlanders of Scotland and Wales supply historical examples. The Afghans still raid the lowland of the Indus basin bordering their hills; the Kurds in the mountainous country bordering the Tigris lowland offer a parallel case. But it needs an exceptional leader to unite mountain-people in a big joint effort for conquest, as Cyrus and Darius did the Persian tribes in the sixth century B.C., so that they built up an empire covering highland and lowland as well.

In fact, save for some such exceptional influence like that of the leadership of Mohammed or Cyrus, or the external pressure which united the Swiss in a confederation—an influence either not at all, or not wholly, geographical—it seems that monotony of surface-relief, just like monotony of climate, makes for a monotonous habit of life, a limited outlook, and a cultural development not of the highest. We find these conditions on the plains, and in the mountains. It follows that variation of relief—that is to

say, the existence within the homeland of both plains and hill-country—ought, if other conditions are favourable, to influence man toward higher achievement; and so it does.

If Britain had been wholly a plain like the Fen country, or wholly mountainous like the Scottish Highlands, we can scarcely imagine it as the motherland of an empire. Its inhabitants would have been few, and devoted mainly to fishing and agriculture or pasturing; it would have been an appendage of some continental Power. But a man need not travel far in Britain to encounter a whole series of different interests, subject to different kinds of geographical control. He may pass, for example, in a few miles, from the cotton-workers' homes in the Lancashire lowland, or those of the wool-workers in the valleys of the West Riding, to those (let us say) of the shepherds of the Cumbrian fells. In a land like ours, with a varied surface, here rich agricultural plains, there pastoral uplands, there again mineral-bearing rocks, there are varied interests almost from one square mile to the next. The distribution of mineral deposits (assuming that they are workable and worth working) specifically illustrates our point. 'Speaking broadly, they belong to the older rocks, and where such rocks are folded and denuded so as to be exposed at the surface, there mining is likely to begin. Folding and exposure by denudation suggest mountainous or hilly country.' We may look, therefore, for the principal mining and industrial districts along the margins of hilly country; in country, that is, of a varied surface, where communication is yet not too difficult. The accompanying map of the chief mineral fields of Central Europe (fig. 2) gives an example: it shows the close approximation of the coal-fields (black, or in the case of lignite, shaded with lines) and iron-fields (I) to the edges of the hilly regions; and the less important fields for copper (C), silver (S), lead (L), and gold (G), heighten the effect. Examples may also be found in Britain, North America, and elsewhere.

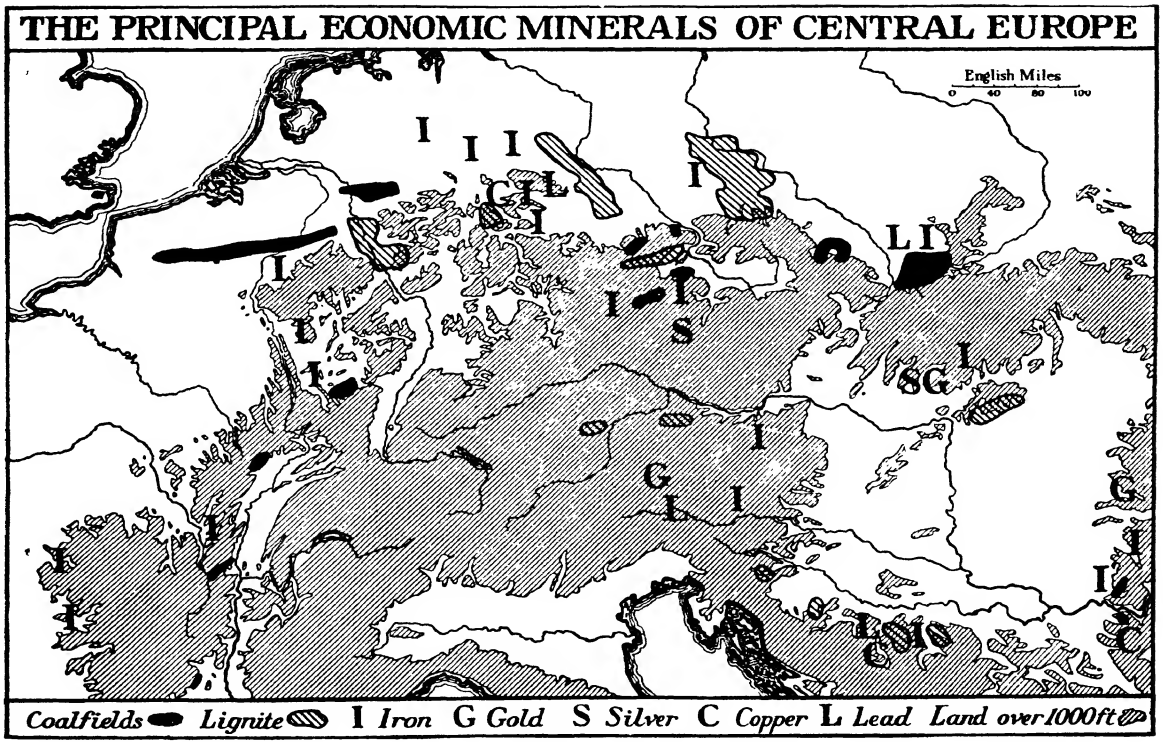
THE PRINCIPAL ECONOMIC MINERALS OF CENTRAL EUROPE
English Miles
0 40 80 100
Coalfields
Lignite
I Iron
G Gold
S Silver
C Copper
L Lead
Land over 1000 ft

Fig. 2.

In such areas there congregates a dense mining and industrial population, with farmers and market-gardeners near by to minister to its needs, and every concomitant form of trade and activity generally.

Our consideration of the environment associated with other land-forms—the island, peninsula, various types of coast, &c.—as also of rivers and seas in this connexion, will be incidental to the subjects of later chapters. Here we turn to take a rapid view of the major regional divisions of the world, in the light of suggestions in preceding paragraphs.

3

Environment and Distribution

In this chapter we are to examine the major factors of geographical environment, as we have outlined them, in respect of their distribution and combination. This amounts to viewing broadly the relationship between man and his chief occupations on the one hand, and the large natural regions of the earth on the other. The sketch-maps in this chapter will help our examination to some extent: larger maps would make the matter clearer: best of all, the student will make his own maps, and elaborate them as he elaborates his studies beyond the limits of this slight sketch. He will not be deceived by the drawing of boundary-lines on the maps between one zone of population and another, one occupation and another, and so on: there is very seldom a boundary really, but generally a more or less gradual merging from one condition into another; and it is hardly necessary to add that the occupations indicated on fig. 3 are predominant, not exclusive.

With man at his primitive stage of hunter or fisherman we have to some extent dealt already when citing in Chapter 1 the examples of the Eskimo and the pygmy. This condition appears, as we saw, at opposite ends of the climatic and regional scale—on the one hand in the tundra and the sub-arctic forest, right across the northern parts of North America and Eurasia; on the other, in the depths of the tropical jungles of the Amazon and the Congo, or in more arid warm lands, as where the aborigines of Australia and the bushmen of the Kalahari in South Africa pursue their not dissimilar ways of life. Only the southern part of South

America stands rather aside from either classification, in respect that its climate is hardly to be called extreme, but it is an arid land, lying under the lee of the Andes.

Viewing the successive maps, we find, in the northern regions of America and Eurasia, a population of the very scantiest, closely coincident in area with the occupations under notice; a climate which (though the map misses this point) includes the lowest known mean winter temperature, in the mid-eastern part of northern Asia; vegetation which passes from the tundra, the open, frozen plains of the north, to the *taiga* or coniferous forests farther south; surface relief which is hardly broken by any upland. One parallel with regions not yet noticed is worth remark: over much of the north Eurasian plain we find a pastoral occupation indicated as we find it also on the interior plains of lower latitudes. Both types of plain forbid cultivation, but the one through cold, the other through dryness. Both induce the nomadic habit of which we have read in Chapter 2; and the nomad of the north has tamed an animal to his needs—the reindeer, alone of domesticated animals fitted to live under arctic conditions, and supplying its herdsman with transport, food, clothing, and shelter, by means of its strength, flesh, milk, and skin.

In the primitive tropical lands, looking through the successive maps, we find, similarly, no approach to great density of population (unless it be on the margins of the forests in West Africa); a climate of excessive heat, accompanied by rainfall either excessive in the forest lands or deficient in the arid lands; relief nowhere greatly diversified.

In these big spaces of the earth, then, man is untempted or unable to contend against natural conditions to any point beyond taking what nature offers (for along with hunting we classify the collection of natural forest products). Nevertheless, in the intertropical belt, in forest clearings, and in the savanna lands

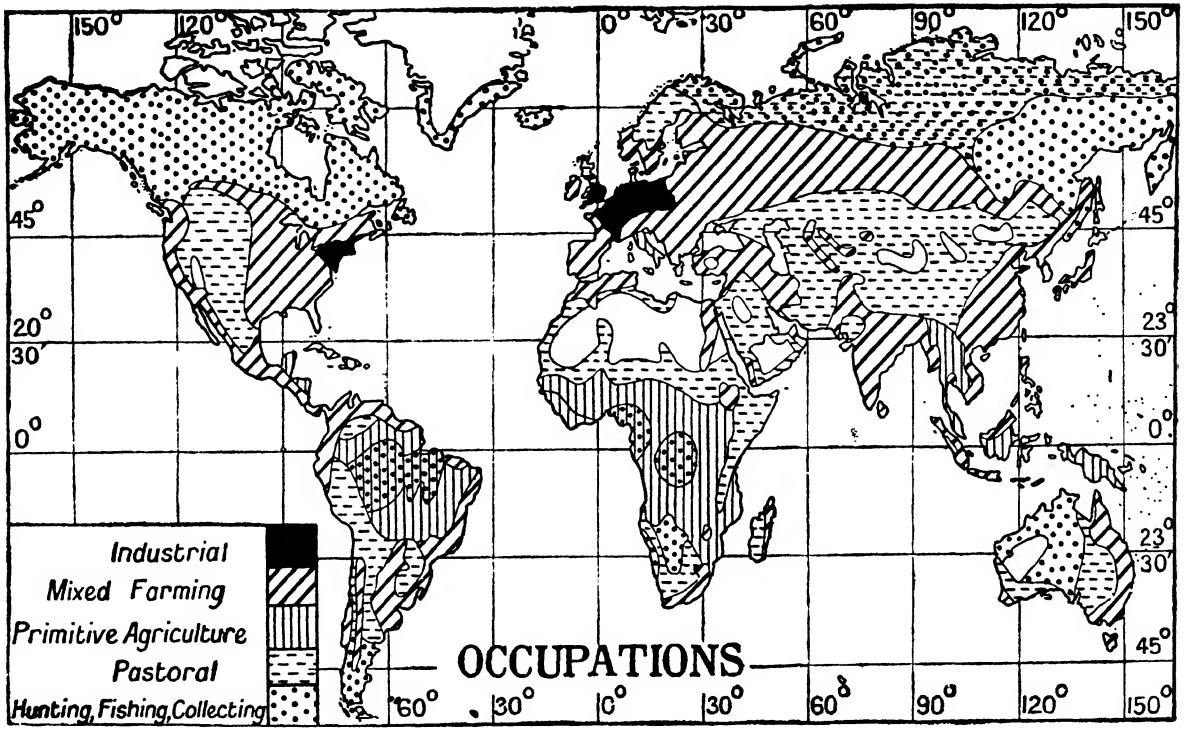

Fig. 3. DISTRIBUTION OF OCCUPATIONS

which fringe the forests, we find the simpler forms of agriculture, done as a rule primitively, and to meet only the cultivator's own needs. The commercial working of tropical forest products such as rubber shows the white man, avoiding or incapable of heavy labour in a tropical environment, supervising the labour of the less highly developed native: of recent years we find the growing demands of commerce met by the cultivation of such products, supplementing the natural yield of the forests, and the organization of native labour under white supervision for this purpose. Here it may be added that the same process takes place when mineral wealth is developed in hot lands, as in South Africa for diamonds, gold, copper, and coal, and in the Malay Peninsula, Sumatra, Borneo and adjacent islands, for tin, oil, coal, and other products. The white man of the cool temperate 'centres', for all his adaptability, has not yet set himself to labour with his own hands on any large scale in hot lands. He has had no reason to do so: coloured labour, either native or emigrant, has been brought to minister to him. Meanwhile his knowledge of proper conditions of health and sanitation under the conditions of tropical environment is increasing in exactitude; and there is no doubt that individually, by adapting his habit of life wisely, he may himself labour successfully under these conditions. But we have yet to witness the establishment of a great active white colony in tropical territory, such as is foreshadowed by the famous policy of the 'white' Australia, in accordance with which that Commonwealth hopes to develop the riches of its tropical lands without introducing immigrant 'coloured' labour on a large scale. It may be possible or (as some believe) impossible: in either case, no stronger justification for the study of geographical environment could be offered than the presentation of a practical problem like this. The motive of the 'White Australia' policy is frankly political: it is directed to the exclusion of any possibility that the influence of a coloured race or races should become established in

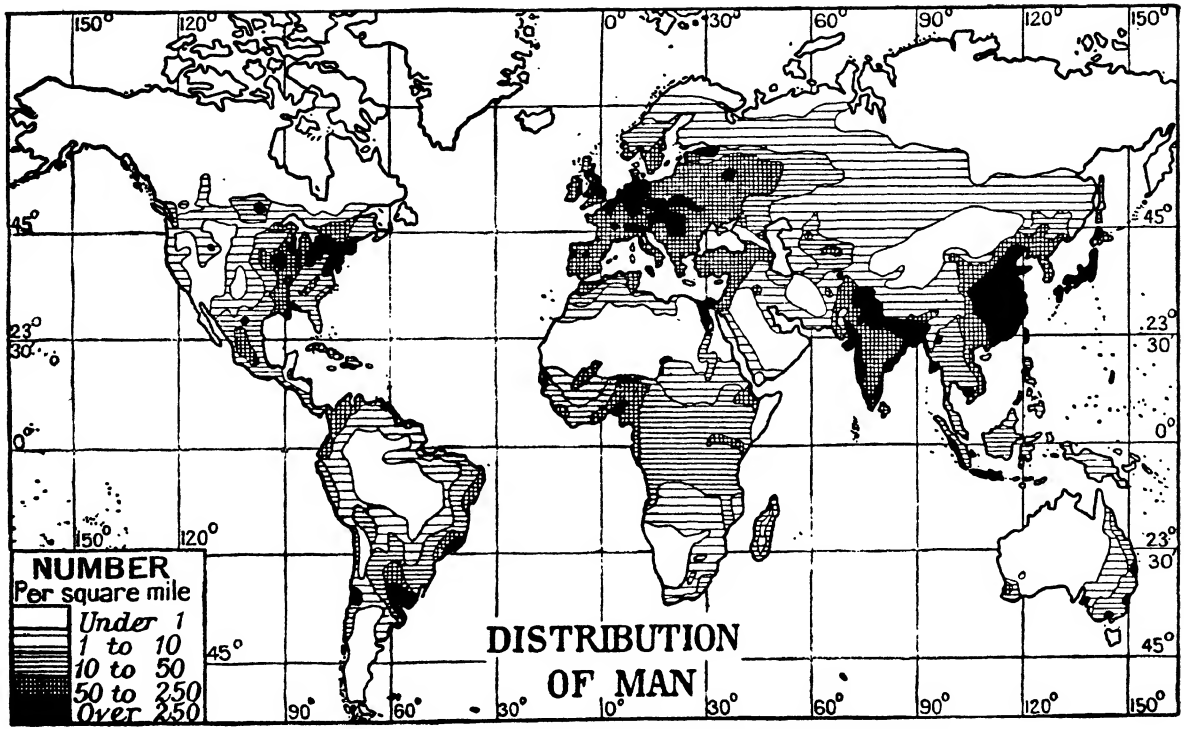

Fig. 4. DISTRIBUTION OF MAN, OR DENSITY OF POPULATION

Australia. Economic considerations do not enter into it: those who oppose it point out that whereas coloured labour, being cheap, could be used on an economic basis in the undeveloped tropical and subtropical parts of Australia, white labour cannot be so used. Nor do considerations of geographical environment enter into it: the balance on this ground would certainly favour the opponents of the policy under present conditions.

The purely pastoral lands are the steppes and similar lands which are too dry for extensive agriculture but not too dry for natural grass. Thus we find them fringing agricultural lands on the one hand and deserts or hunting lands on the other: in the middle west of North America, the drier parts of the Plata lands of South America (Argentina, &c.), the drier steppes of Eurasia, the borders of the deserts of Syria, Arabia, and Africa, the interior grass lands of Australia. We are familiar already with the description of the primitive pastoral nomad, who is dependent for food, drink, clothing, and tent-covering upon his animals, whether they be cattle, yaks, sheep, horses, or what: he, through his herds, is as dependent on his environment as the hunting Eskimo or pygmy, but he is better capable of movement, and being more mobile he may, as we have seen, if circumstances are otherwise favourable, rise higher than they in breadth of outlook and interests.

Nevertheless, so far as the occupations we have discussed are primitive occupations, they, and the geographical environment which begets them, do not raise those who practise them high in the scale of organization as communities—not much, if at all, above the tribal standard. Fully organized independent states are not formed on the basis of hunting, primitive agriculture, or purely pastoral occupations. And even when the pastoralist is a (more or less) highly civilized member of a highly organized community, as in North America, Argentina, or Australia, there is often a certain freedom in his attitude toward the law and order

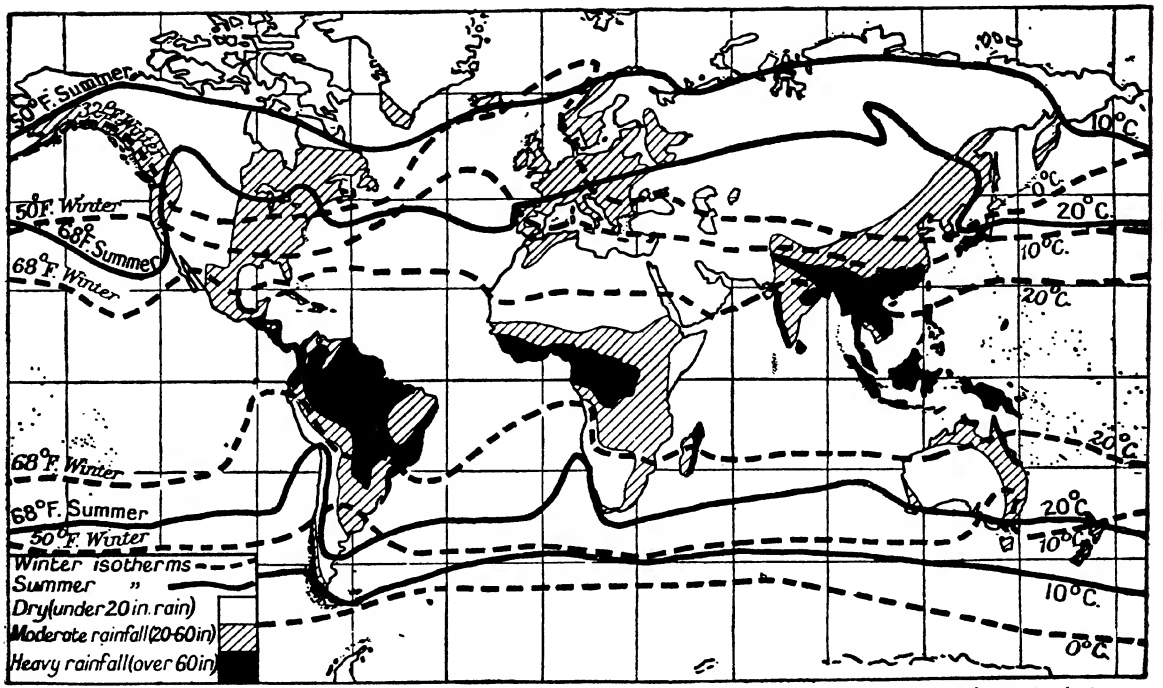

Fig. 5. THE ISOTHERMAL LINES of 0°, 10°, and 20° C. (32°, 50°, and 68° F.) are drawn for Summer (July in N. Hemisphere and January in Southern) and Winter (January in N. Hemisphere and July in Southern).

The rainfall lines of 20 and 60 inches are shown. The arid or rather dry regions are left white, those with a moderate rainfall have a ruling of parallel lines, those with a very heavy rainfall are shown black.

of the State, born of the freedom of his environment and his own mobility. A settled order of government seems first to be evolved rather in those lands where a settled and highly developed form of agriculture is possible (compare Egypt, p. 38).

This form of agriculture is labelled 'mixed farming' on the map: its products vary, of course, according to localities and natural conditions. On the one hand it includes the home-produce of the temperate centres of population in Europe and North America, and the lands beyond from which these centres are supplied with the food they do not produce for themselves. On the other hand it includes such self-sufficing agricultural communities as those of India and China.

The relationship between these grand agricultural regions and climatic conditions is obvious and easily traced, and allowing for differences in extent and relief it is of interest to notice a community of pattern on the map between the farming lands of Eurasia and those of North America. They front the North Atlantic Ocean (and its branch seas) broadly on either coast. Thence, as the climate becomes drier and otherwise less suitable, they are seen tapering inland, in both continents. The map showing the distribution of man reveals a parallel too; more clearly, in the sketch herewith, in Asia. The difference of relief rather modifies the comparison between the Asiatic and the North American Pacific coasts; on the one hand there are the rich plains and uplands of China, fronted by the exiguous but fertile cultivable lands of Japan; on the other only the narrow but not less rich coastal strip and valleys of the western mountain system of North America. We may stretch the parallel still a little farther to compare the Mexican and Central American isthmus with India, and the islands of the West and East Indies respectively.

Comparing the maps, we are able to see a number of other relationships, starting from the map-lines between the pastoral

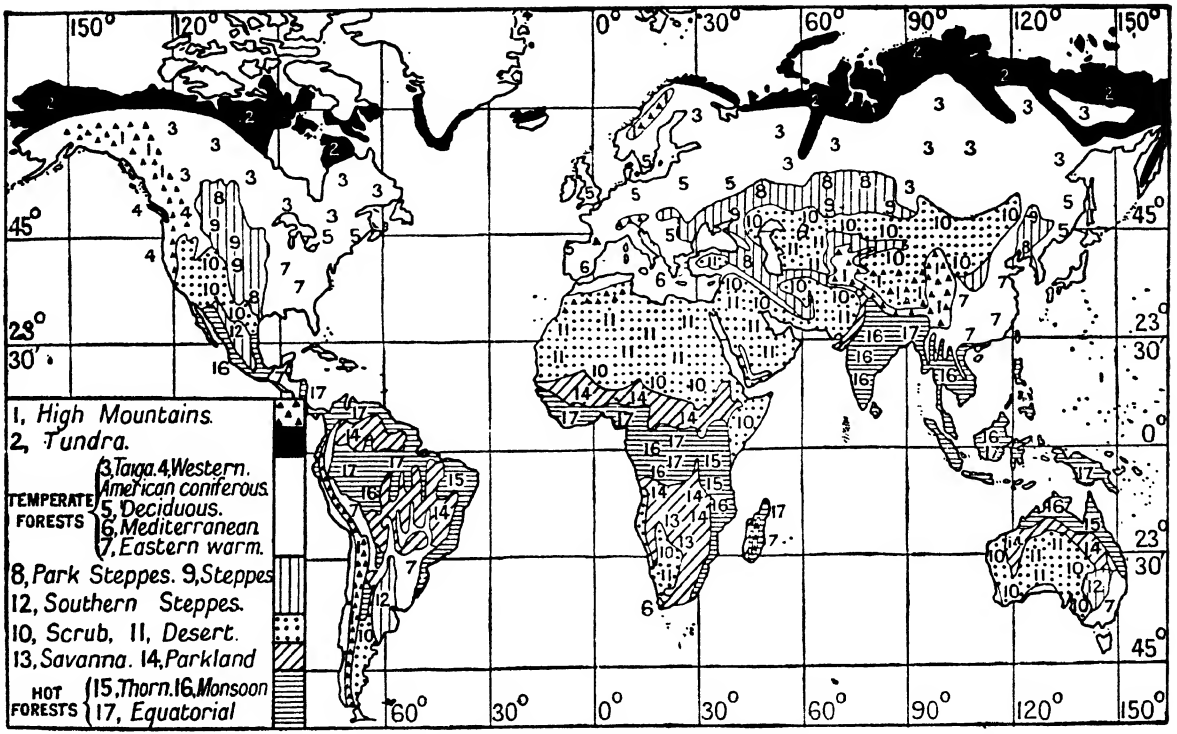

Fig. 6. DISTRIBUTION OF VEGETATION

and 'mixed farming' areas. For example: in North America we pass eastward from pastoral to agricultural lands in fig. 3; westward in western Asia and south-eastern Europe; eastward again from central to eastern Asia. So do we pass, in these areas, from sparsely populated lands to lands successively more densely inhabited (fig. 4); from dry regions to those with adequate rainfall (fig. 5), and through successive types of natural vegetation, from desert and scrub to steppes, 'parkland' and savanna, and temperate forest. We can apply similar comparisons between the maps in parts of South America, Africa, and Australia, in the eastern half of which the whole series of relationships is particularly clear. The interaction of elevation (fig. 7) with climate belongs to the study of regional geography. It is a truism that a man climbing a high mountain in a tropical land may encounter the same successive conditions of temperature and vegetation as he would on a journey from tropic to pole. High elevation in cold latitudes merely intensifies the measure and conditions of a cold climate. High elevation in warm latitudes modifies, or may completely alter, the conditions of climate, vegetation, and environment in general, characteristic of those latitudes. Thus we find in Mexico, and parts of the Andes, such elevations as provide, within the tropics, large areas where men may live under temperate conditions of climate, with all that those imply: the East African plateau, again, in Kenya and Tanganyika, though actually crossed by the equator, offers, thanks to its elevation, opportunities for settlement to white men. The extreme example is supplied by Tibet, which includes the highest inhabited region in the world.

Even in our tiny maps instances are visible of divergence from the normal relationships indicated in the preceding paragraph. Thus in north-east Africa we observe a belt of 'mixed farming' (fig. 3) with a dense population (fig. 4), cutting athwart a vast area of deficient rainfall (fig. 5) which fig. 6 shows to be desert. In

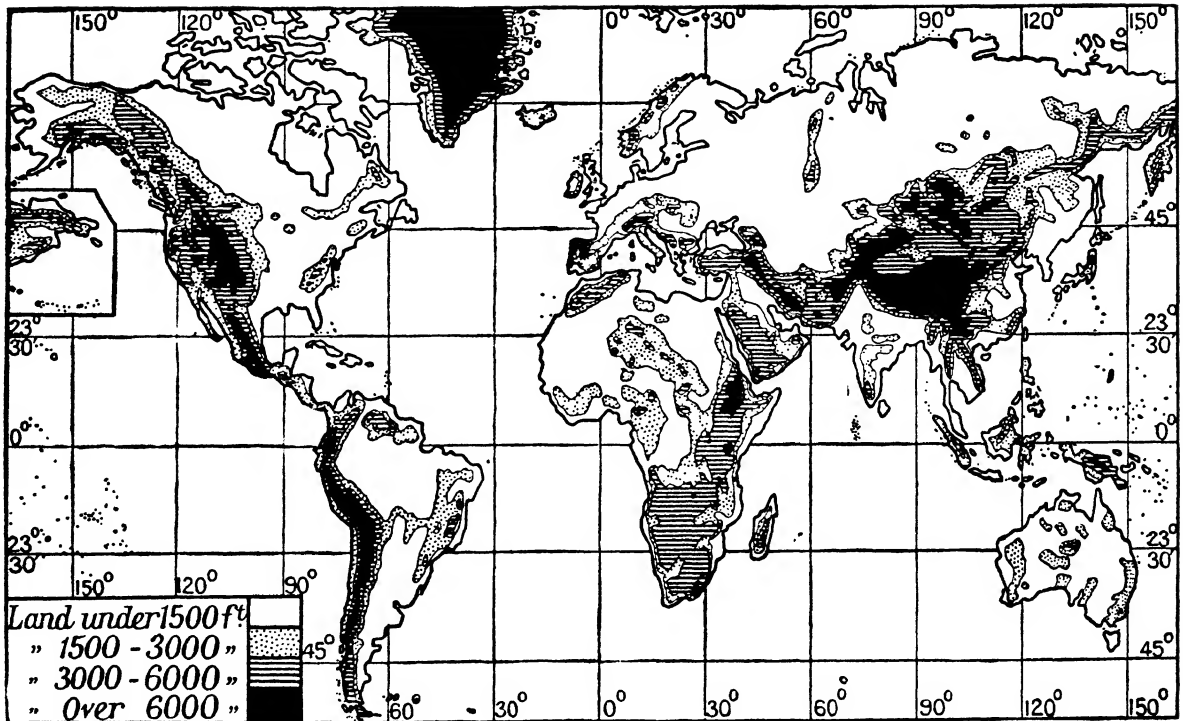
150°
120°
90°
60°
30°
0°
30°
60°
90°
120°
150°
45°
23° 30°
0°
23° 30°
Land under 1500 ft.
" 1500 - 3000 "
" 3000 - 6000 "
" Over 6000 "

Fig. 7.

north-western India the agricultural lands and dense population appear to be carried up to the edge of the lowland (fig. 7) and to overpass the limits of a barely moderate rainfall (fig. 5) and a natural scrub vegetation, or desert (fig. 6). Something of the same sort can be seen in Central Asia, south-eastward of Lake Aral. In the south-west of North America the extent of scrub (or desert) in fig. 6 suggests that the little area left without even pastoral occupation in fig. 3 gives a rather too favourable view of the dry lands of the northern Rocky Mountain area. A minute comparison of larger maps ought to show similar discrepancies elsewhere, as in south-eastern Australia. So in these cases there is some circumstance of geographical environment which has hitherto been wanting from our argument. It is the existence of rivers capable of use, and used, for irrigation.

The river Nile makes our north-east African belt, stretching narrowly along its shores, the best example: best because it is best known, and also because it helps us to pursue an argument from a few lines back (p. 34). The Nile, bringing moisture and fertile soil to a rainless and otherwise desert land—Egypt—from its distant sources in the highlands of east-central Africa, is here the leading theme (so to say) in the geographical symphony. But the benefits conferred by a river, as an item in the scheme of geographical environment, require the exercise of man's ingenuity, to put them to use, on larger lines than are demanded in the case of the primitive hunter or nomad pastoralist. True, the native agriculturist, low in the scale of development, laboriously irrigates his dry field with a bucket, but he readily conceives some simple mechanism to help him lift it, and some methodical way of distributing water through little artificial channels. From these he marches on to the conception of big works, provided that the little ones do not give him all he wants in the way of crops. In Egypt they could not do this, with the desert as it were knocking constantly at his back door, nor in the lowlands

of the Euphrates and Tigris (Mesopotamia), nor in Arabia. It is thus that we find irrigation on the grand scale an art very early developed, in lands where the geographical favour of suitable rivers was present, but the geographical drawback of a rainless climate and severe aridity had to be overcome. And in such an environment we encounter, for the first time in our survey, lands which have been the seats (not merely the appanages or outlying territories) of great political Powers. If these have fallen, as Egypt and Assyria and Babylonia fell, one reason must be that their environment, though it aided their development, kept it along too narrow lines.

In the dry districts of north-western India the construction of irrigation canals under British supervision has accomplished wonderful things. The great Chenab canal, for instance, 'ten years after its beginning, served a district of nearly 3,000 square miles which had been practically desert, and the settlers on the new lands, introduced from overcrowded districts, numbered over three-quarters of a million'. Irrigation works include not only the distribution of water from large rivers which maintain a more or less regular flow through dry lands, but also, by means of storage works, the conservation of water for use during dry seasons, as in other parts of India under the alternate seasonal wet and dry conditions of the 'monsoon' climate. In the arid lands of the western United States big irrigation works have been executed by the Reclamation Service under the central government. Many other examples can be found of this use by man of a particular favourable geographical factor (the river, or the heavy seasonal rainfall) in opposition to other factors which are unfavourable. Among these the use of water from artesian wells—deep borings from which the water flows naturally under pressure—may be noticed in Australia, Algeria, and elsewhere. In the case of rivers there may be concomitant factors to take into account. For instance, the flow of a river may be naturally

regulated by lakes or swamps in its upper course : the Nile is so regulated ; so are the Ticino and Adda which are used for irrigation in the north Italian plain. Glaciers, melting in summer, maintain the flow of rivers issuing from them during that season even if it be dry : this applies to northern Indian rivers rising in the Himalayas.

Of the areas of most dense population, shown in black on fig. 4, we find the major examples in western Europe (including Britain) and eastern North America, in India and the Far East, and these may now be examined further.

On either side of the North Atlantic Ocean, in western Europe and in eastern North America, there are situated what we may call the two greatest 'temperate centres' of dense population. They have much in common. As to climate, we have found already that the American 'centre' is subject to rather more extremes than at least the greater part of the European. We must not venture to speculate upon the effects of the American climate upon temperament in contrast (for example) with our own. The essential fact is that there is in both regions a sufficiency, but not an excess, of variety in the climate. Each of our regions, European and American, has a long seaboard upon the Atlantic. The European region has better sea-access than any other region of similar area ; by the English Channel, North Sea, and Baltic on the north ; by the Mediterranean and Black Seas on the south, and from these by a series of valley-highways—Seine, Rhine, Elbe, Vistula, and the rest northward ; Rhone, the routes by the Alpine passes, Vardar, Maritsa, and the big Black Sea rivers southward. The American region is entered by a series of routes of which those of the Hudson and the St. Lawrence are by far the most striking geographically, and the most important. On the landward sides our regions have very similar natural frontiers. Northward, their limits are not far from coinciding with the southern limits of the coniferous forests of the north. Eastward

in Europe, westward in America, both regions merge into plains—those of Russia in Europe ; in America, the prairies of the middle west. In both, the population thins as the plains become drier, changing gradually from rich agricultural lands with an annual rainfall of 20 inches or more, and capable of supporting a pretty dense rural population, to the dry steppes or ranching lands, with which we have dealt already (p. 32), when we viewed this transition from the opposite direction.

Whereas these regions fringing our populous 'centres'—the northern forests, the Russian steppes, the American prairies—have the common physical quality of monotony, there is a great variety of relief and surface-covering in western Europe and in eastern North America. It is hardly necessary to point out that these two regions are not covered all over with a numerous population equally distributed. Within both regions there are substantial areas—mountainous, marshy, unfertile, or otherwise inhospitable—where there is but the scantiest population, if any. But for the rest there are rich valleys and hill-slopes, noble rivers and lakes, scenes fair to look upon, lands both fruitful and rich in minerals. There is variety. When men first explored and opened up the American area, Nature opposed sufficient obstacles to exercise their ingenuity, but not sufficient wholly to discourage them. As for the European area, we shall return to it later (Chap. 6) to consider the influence of the varied environment it has exercised upon the establishment of the various political States, relatively small in area but some of them world-powerful, among which it is divided.

In the Far East, Japan and the temperate part of China supply a pretty close Pacific parallel to our two Atlantic centres, if we make allowance for the immense racial and temperamental differences. It is tempting to speculate on possible connexions between our large principles of geographical influence and the fact that China, after rising in early ages to a high comparative

standard of civilization, did not in later times keep pace with the modern standard set by our Atlantic ' centres '. Insular Japan, like insular Britain, developed later and has maintained development. The vast extent of the Chinese plains must surely have played its part in limiting the Chinese outlook. In the warmer parts of the country, on the whole more varied of surface, perhaps the climatic factor comes into play.

Some support for this idea is found if we consider India, one of the great ' hot-belt centres ' of population. It contains communities in almost every stage of development, from the most primitive nearly to the most advanced ; but all are subordinate to European administration, and even those of highest standard owe much to European influence. India, until brought under that influence, stops short (so to say) at agriculture, as China does ; both practise that, it is true, to an extent and with a manual skill beyond European comprehension ; but neither has been, as a rule, inspired by environment to look beyond the boundaries of the agricultural holding. India is a great land kept isolated by the mountain-wall of the Himalayas on the north, and by unsheltered coasts not specially fitted to breed sea-farers on east and west ; with vast expanses of plain, plateau, jungle or what not offering little diversity over large areas ; and with a climate rigidly seasonal in its variations, often enervating, sometimes cruel. Such, in the broadest terms, is the geographical environment of India ; it is clearly a less inspiring environment than that of western Europe or eastern North America. A stock geographical contrast is that between the wheat-eaters of the temperate lands and the rice-eaters of the hot lands. The wheat-eaters feed their close-packed manufacturing communities with grain grown, it may be, on the opposite side of the world, and transported in bulk to supplement the insufficient home produce. The rice-eater grows his own staff of life for himself, and if his crop fail he (unless a European government ministers to his need)

may likely die. This contrast (considered as an effect) is illustrative of the whole contrast between the environments of 'East' and of 'West', or between our 'hot-belt' and our 'temperate' centres.

We have suggested that the instinct for highly organized government is born of the same environment as a settled and highly developed agricultural community. Even in self-sufficing communities such as Chinese or Indian, the minute division of a fertile soil between a great number of proprietors necessitates some form of administration and judicial control. The feeding of the 'temperate centres' with wheat and other foods conveyed from distant fields involves the whole question of organized commerce on the grand scale, and that presupposes highly organized government. And finally, beyond this, those portions of the temperate agricultural regions which we have described as fronting the North Atlantic broadly on either coast, are in point of fact very nearly coincident with our 'temperate centres' of population, except at the very highest points of concentration of humanity, where agriculture gives way to mining and manufacturing or other such predominant occupations as cause the growth of large towns. It is well to remember—lest we should be a little dazzled by the geographical marvels of the overseas wheat traffic which helps, above all, to feed ourselves—that Europe, at least before the great war, was still producing more wheat than the rest of the world. A study of the world-map sometimes generates wonder that there is room in Europe for everything that happens in it.

4

Migration

THE movements of men which we group under the term 'migration' are of different types, and may or may not be started by the influence of geographical environment. Those early movements which can be deduced, or traced backward to periods long before the dawn of history, may sometimes be assigned to geographical causes. The original homeland may have become incapable of supporting its population, whether through some actual physical change, or because its inhabitants have numerically outgrown its resources. The geographical impulse to movement may alternatively be found, not in the failure of home resources but in the attraction of better conditions—richer soils, fatter pastures, better climatic conditions, water-supply and so forth—in a neighbouring district. It is difficult to draw a line between these alternatives; but the attraction, as such, of better conditions—as for example the wealth offered by a newly discovered gold-field or newly opened agricultural lands in modern times—would only exceptionally cause a movement of people by itself; we may usually presuppose some impulse from within. This, as we have said, may consist of some adverse geographical condition, or on the other hand of expulsion by an enemy, or of some form of political or religious or purely economic compulsion with which we have no concern here. Again, movement may be born primarily of the high spirit of adventure. As to different types of migration we need only remark here that they range from single more or less concerted movements like the biblical Exodus or the (anything but biblical) 'gold rush', to slow movements

or ' drifts ' as they are termed, continuing from one area to another over long periods.

At least in the case of the earlier or more primitive types of migration, geographical influences more usually control the progress of the movement than its start. (This process is epitomized in the first eight verses of Psalm cvii.) But there are instances, some of far-reaching import, of the start of movement having a definitely geographical origin. We may trace the geological history of Central Asia from the glacial period when the ice-cap, at its widest extent, came southward to where the northern border of Chinese territory now runs, and still farther south over the high plateaus of Sinkiang and Tibet. From that period the land dried off through successive stages, from lakes and marshes as the ice receded, to grass lands, and at last to steppes or sandy deserts which crept in widening areas over tracts which had supported large populations. These then were forced to move, and from Central Asia, therefore, are originally traceable many of those great protracted movements which led to the peopling or conquest of other parts of Asia and of Europe. The natural barriers of mountains, deserts, and forests play their part in arresting or deflecting such migration ; the natural communication-lines of plains and wide valleys lead it forward. Arrival in a fertile valley arrests nomadism, and tempts to permanent occupation. Not that the process of human ' drift ' should be confounded with nomadism. It is a slower, larger going. The Israelites were forty years moving through ' the wilderness ' to the promised land. The Finno-Ugrian stock, which, as represented by its languages, includes the Finns, Ests, Letts, Magyars, and other settled peoples of Europe to-day, is traced in origin to the land of the head-waters of the Yenisei in Central Asia ; one of its members, the Samoyeds, moving northward to the arctic region, have been restricted in development by the severe conditions of life on the tundra, and are said still to

retain, in the case of individual groups, the tendency to drift westward.

Israelites and Samoyeds—we may picture them, under the widely divergent conditions of their respective wanderings, bound each upon the wheel of an unkindly environment, staying for a while in one situation till its slender resources were exhausted, and then moving again: so it must have been with many other migrants. As their ways lead them, we may conceive any group of them gathering experience upon the journey: *vires acquirit eundo*. So when they reach a land holding out promise of settlement they are able to take advantage of that promise. And thus we may seek to account geographically for the existence of that very early centre of civilization in the lowland north of the Persian Gulf to which the name of Mesopotamia has come to be generally applied. The earliest known Sumerian settlers here are traced, by some authorities, from Central Asia; but there came also to this land Semitic people from Arabia to the south and south-west, so that the later power of Babylonia emerged from a mixture of blood. We may view this potentially fertile lowland, then, as surrounded by less favourable regions—rough mountains to north and east, desert to west and south—and thus a centre of attraction for peoples impelled to movement by adverse conditions. Of the influence of environment upon man during his movements—whether it keep him backward or advance him in culture—we find clear illustrations elsewhere. Thus in South America before the irruption of the European adventurers we observe the high state of culture under the favouring conditions of the central Andean plateaus, whence the powerful and civilized Incas had extended their domination northward and southward over Chimu and Quichua; on the contrary, in the forest region of the Amazon there are the peoples who in the course of their movements never found an environment in which to develop as the Inca did.

Another aspect of migration may be considered in connexion

with the geographical environment which helps to fashion the builders of empires. In this connexion we are brought to think of the environmental effects of certain geographical factors upon which we have touched little before; of the sea, of islands, and of peninsulas.

The terms 'isolation', 'insularity', not uncommonly applied to communities of mankind, are essentially geographical in their meanings. They connote, properly, the environment of the island. We in this island of ours should understand this: we are dubbed 'insular' often enough. And no doubt with a good deal of reason; but insularity does not carry with it narrowness of outlook: there would not be a British Empire if it did. Instead, an island and its people look out over the seas surrounding it. An island favourable in its own environment becomes often very densely populated—you can find instances of this in plenty, from Britain to many of the little islands of the Pacific. That condition may react upon the people in various ways—it may make them cannibals, and in other ways careless of human life; it may induce them to a specially high standard of intensive agriculture, and so forth. But common to all islands is the call of the sea, and the protection afforded by the sea, not yet greatly modified (though perhaps to be so) by man's 'conquest' of the air. So that men looking abroad from the security of islands may be led to form empires, as they did from Crete in the morning of history in the Mediterranean; as those far-scattered megalithic remains suggest they may have done in the Pacific before history records; as the Japanese have; as we have.

Peninsulas share with islands the protection and the influence of the sea, modified by their attachment to the mainland. They may have served as refuges for early inhabitants of the mainland retreating before invaders, as Brittany and Cornwall did; in any case they tend to preserve inhabitants unmixed in race. The Danish, Iberian, and Italian peninsulas have done that; if the

Balkan has not, it is because this, as geography defines it, is much less ' nearly an island ' than the others.

This implies that for the purpose of our short survey the most important results of island-environment are political, subject, of course, to other favourable factors. The same effect is associated with peninsulas: ' peninsularity ' as well as insularity appears to favour empire-making. If the English Channel had never been cut, Britain as a peninsula might still have been the home of an imperial people, though London would certainly not have been the capital of the Empire. The kingdom of Alexander the Great was in the Balkan Peninsula, and Rome, Spain, Portugal, and the Norsemen of Scandinavia provide other examples in history. Taking a step farther we may ascribe a quality akin to insularity to the centres of other empires like Mesopotamia and Egypt, isolated, if not actually by sea, at least by sea-like lands in the sense that men moved over but did not rest upon them.

Reverting to our own empire: we have suggested earlier that ' some of the many conditions precedent ' to its foundation were geographical. Thus: the islands as such, and the adventurous sea-farers whom they bred, specially in the west country of England; the position of the islands as an outpost of civilized Europe toward the Atlantic—how effectively this second cause operated is exemplified by the fact that our earliest colony was Newfoundland, our nearest neighbour across the western ocean. But it must be remembered, too, that Britain and Ireland are islands of such size and geographical diversity that their inhabitants acquire a character not exclusively insular; their home-lands have yielded them sufficient breadth of interest, scope for activity, and wealth to enable them to look and move abroad in order to widen that breadth and scope, and to increase that wealth. That a people may become builders of an empire, the home-land must offer certain inspiration, and must impose

(in itself) a measure, but not too full a measure, of restriction. We have an illustration, curiously appropriate in this connexion, of the result of too rigid restriction by geographical environment. For the Norsemen saw Newfoundland, and fragments of the near American mainland, centuries before our adventurers did. But the geographical conditions of their own narrow seaboard in Norway, and their own well-loved fiords and sea-ways, wedded them so closely to their ships that they had no eyes for a new continent. They had the inspiration to push west oversea; but not overland.

We have indicated some effects of the position, form, and size of the home-land upon the building of the British Empire. There is reason, too, to suppose that the climate of our islands has something to do with the matter. It may be suggested that our own temperate, changeable climate, demanding of those who live under it a certain adaptability of body and mind, best fits men for settlement and work abroad, under the widest possible range of climates. There is something of fancy in this, perhaps, but the argument can be supported by analogy. The Roman was reared in a climate which made him less adaptable to others than the Briton, and his empire was essentially an empire of the middle latitudes. The Spaniards and the Portuguese made no attempt at empire-building in climates less genial than their own. The Briton labours or administers under the climate of any latitude from the polar circles to the equator.

Imperial movements apart, there are suggestions of the same tendency in the distribution of the principal groups of emigrants in modern times. The Briton is everywhere where migrants congregate; the German follows him closely in extent of distribution. The Chinese have a wide range of climatic conditions at home, and the Chinese emigrant has a wide range too, but his movement takes place mainly within the tropical or subtropical zones. The Italian, most active migrant among modern Mediter-

ranean peoples, keeps nearer to his own latitudes or those corresponding to them in the southern hemisphere ; thus he is strong, proportionately to others, in California and Louisiana, and in the Argentine. The migrants from hot lands, such as those from India to Malaya, East Africa, and British Guiana, still more explicitly illustrate the point.

5

Transport

THE bearings of geographical influences upon transport are important. Obvious as they also are in many of their aspects, they are worth summarizing because they illustrate very clearly the whole relation between man and his geographical environment at successive stages of his development.

The least efficient carrier is man himself; therefore he only remains as his own general transport agent (so to say) in lands where the use of four-footed animals is for one reason or another impossible or very difficult, and of course where mechanical transport is wanting. Such reason may be found in the relief of the land—a mountainous area, for instance, where the slopes are too steep for animal transport, as in parts of Japan, the interior of China, Tibet, &c., and certain districts of the Andes. In the dense tropical forests, both in Central Africa and South America, there are found only narrow tracks passable by men in single file through the thick vegetation; again, in parts of Africa particularly, both central and south, the use of transport animals is restricted or prohibited by the existence of harmful insects.

In connexion with animal transport we first think instinctively of the horse; but geographical conditions operate in limiting his use and substituting that of other creatures. There is a series of animals which are specialized to the conditions of particular regions; such are the reindeer of arctic Eurasia, the yak of the Central Asian highlands, and the llama of the Andes, all habited to cold lands; the first to plains, the other two to mountains; at the other end of the scale is the camel of the desert. Again,

the donkey and the mule, humble relatives of the horse, are adaptable to conditions to which he is not; more sure footed, they are more generally useful in mountainous lands, and the donkey can exist upon much poorer pasture and less daily food, so we find him in dry lands like Egypt. It is principally in warm or hot lands, like India, that oxen and buffaloes appear as beasts of burden; and the horse, at his highest development, is a creature for the free range and moderate conditions of the temperate plains and lowlands.

The limitations imposed by geographical conditions upon road-making are fewer than in the case of railway-construction, largely because road-transport is less dependent upon a level surface than a railway train is. (The use of a rack railway, or of electric in place of steam traction, modifies this contrast to some extent.) The reasons for which first-class road-systems are comparatively rare are mainly economic and historical, but in some measure geographical. England, for instance, had a highly developed road-transport system, supplemented by waterways, before railways were developed. In countries of more modern development, such as North America, we find there has been no period for the establishment of an extensive road-system, between that when rivers and lakes carried most of the traffic, and that in which the railway system was laid down. The railways, not the roads, opened up thousands of square miles of unoccupied territory, especially in the middle plains of North America, their planning and construction preceding settlement. That process yet continues in the middle west of Canada. Railway extension, again, lies near the root of the problem of settling the great untenanted lands of Australia, and thereby establishing a powerful white nation in the Western Pacific. For there, so long as geographical conditions offer no obstacle (in the way of dryness) to settlement they certainly offer none to railway construction. Under such influences as these, it is possible to foresee the development of

road-systems following, not preceding, that of railways, in order to carry motor traffic as ancillary to the railway system.

The geography of railway communications is an interesting branch of our subject, of which we can give only a few examples here. Our own system may be regarded as a finished system; no large extension of it is within view, unless it be in the direction of development of the urban system of London, or of connexion with the European system by way of a Channel Tunnel, or (more remotely) of connexion through another submarine tunnel with Ireland, and a first-class West-Irish port for transatlantic traffic. Our system, finished as we have termed it, conceals its own beginnings and the broad geographical influences which worked upon it. We are prone to think of it as radiating in the first instance from London, but it did not begin so: it radiated from big manufacturing centres and London concurrently. For instance, in a map of 1845, we observe quite well-developed systems of lines in the Northumberland–Durham coal-field and manufacturing area, in South Lancashire and Yorkshire (with an extension eastward to Hull), and in the Birmingham area; and, detached from the rest, lines from the South Wales coal-field to the coast at Cardiff. Of trunk lines from London there were only five. The continental line to Dover took the now strange-looking route outward through the hills south of the capital by the gap at Red Hill, and thence eastward. A line served Basingstoke, Winchester, Southampton, and Portsmouth; another Bristol and Exeter. The trunk line to the north served Birmingham, Manchester, and Liverpool, but the present 'west coast' route to the north stopped at Lancaster. From Rugby and Birmingham there were lines to Derby, where a line proceeded north through Yorkshire to Newcastle, and it is of special interest to notice that the east and west route from Newcastle to Carlisle was the only one serving the latter city, which afterwards became a focus of communication south and north, between England

and Scotland. The seaside towns of Whitby and Scarborough in Yorkshire were already served (as Brighton was from London). An East Anglian trunk line ran through Cambridge to Yarmouth. Lastly, the west and north line between Bristol, Gloucester, and Birmingham was already constructed. Among branch lines, the existence of the long spur from Blisworth through Northampton and the leather-working district to Peterborough may be remarked.

For a great railway-system in the making we may revert to Australia. In all the states except Queensland the main lines converge generally upon the respective capitals, which are situated on (or in the case of Perth in Western Australia, near) natural harbours of outstanding merit. In Queensland, by contrast, geographical conditions dictated a whole series of coastal settlements and ports, from each of which a railway runs inland to pastoral, agricultural, or mining centres. The individual states, before their federation into a Commonwealth, suited each its own geographical and economic considerations by selecting the most profitable gauge for its lines independent of the rest; therefore three different gauges (3 ft. 6 in., 4 ft. 8½ in., and 5 ft. 3 in.) are found on the trunk lines in different parts of the continent, and five changes are necessitated on this account during the transcontinental journey between Western Australia and Queensland. The grave disadvantages resulting from this discontinuity have now brought within view the costly remedy of converting the trunk lines to the standard gauge of 4 ft. 8½ in. where they are not on that gauge already. The future development of the Australian system lies, as we have seen, in the direction of extending lines through lands at present unoccupied, and of completing a north and south transcontinental line to connect Darwin and Adelaide. This may run either direct, or eastward of the direct line, so as to tie together the ends of the lines which now penetrate the interior from the east. The completion of the transcontinental line was effected only in 1917, when connexion

was established between the systems of Western and South Australia, which had hitherto been held apart by the intervening arid lands. These states were till then united only by a sea voyage of 1,340 miles between their chief ports (Fremantle and Adelaide), and were thus only by 300 miles less distant one from another than the west of Ireland and Newfoundland across the North Atlantic.

There is an attractive parallel between the construction of the transcontinental line connecting Western Australia with the east and that of the Canadian Pacific Railway connecting British Columbia with eastern Canada. In both cases there was a fully organized territory in the west of the respective dominions, a geographical unit, developed as such for its own sake, but separated by a vast undeveloped region from the eastern settled lands. British Columbia entered the confederation of the Dominion of Canada on the understanding that rail connexion with the east should be provided; Western Australia joined the Commonwealth on a similar understanding. The physical obstacles in the way, however, were different. In Australia the arid lowland of the south centre must be crossed: the line traverses some land capable of development, no doubt, but some incapable; the difficulties of constructing the Canadian Pacific Railway lay chiefly in the mountains of British Columbia itself and in the rocky tracts north of Lake Superior, while the central plains have been the scene of the wonderful agricultural development, since the coming of the railway, to which reference has already been made.

The navigation of rivers represents a stage in the development of transport anterior to that of railways, obviously. But this effect is illustrated in an interesting way in countries where railways act merely as feeders to, or complements of, a system of inland navigation. Of the first alternative the river Magdalena in Colombia (South America) affords the best surviving example,

with successive short spurs of railway running inland from ports on its banks. Of the second, the Congo is the type, with the railways running along those parts of its course which are not navigable owing to cataracts and rapids. The so-called Cape-to-Cairo route, northward of the Congo toward and along the Upper Nile, provides further instances of similar conditions. Such development may be foreseen in the Amazon basin. The persistence of river or canal navigation on any extensive commercial scale against railway competition is unfamiliar in our country, but is found in Europe: perhaps the Rhine with its shipping activities in spite of railways along both banks is the best example.

The existence of navigable waters constitutes one of the most powerful influences of geographical environment. The instinct to navigate comes very early in human development, unless in the rare combination of conditions of dangerous waters (such as an unprotected sea-coast) and want of materials for boat-building. But if the waters are safe the most unpromising materials may be used, for lack of better, to construct the primitive vessel, such as reeds tied into a bundle, or woven into the basket-shape of that ancient form of boat, the *kufeh* of the Tigris. Some boats which, as forms, are primitive, nevertheless are accompanied by a high degree of skill in their management, such as the Eskimo's *kayak*, or the American Indian's bark canoe, or the Pacific islanders' sea-boat. The primitive man remains content with his perfect handling of these simple craft; but peoples who have a chance to practice on quiet waters and are then tempted to take to the open sea evolve successive stages of development. From the Norsemen setting forth from their sheltered fiords across the North Sea and the Atlantic we trace their descendants to-day owning a mercantile marine powerful out of all proportion to their numbers.

The mention of the Tigris in the preceding paragraph brings to mind the importance of river-ways in connexion with early

civilizations like those of Mesopotamia and Egypt (though toward each of these, as we have seen, the rivers lent aid in another direction—that of irrigating the land). As for the importance, and the gradual expansion, of the influence of the sea-environment —an influence wider-reaching and more sustained than that of any river could be—it has been sketched elsewhere [1] as follows.

'The first stage of Atlantic sea-traffic is found in the Eastern Mediterranean. In very early times the Egyptians had some traffic in that sea, and about 2,500 years before Christ a centre of early civilization, strongly established in the Aegean (Crete, &c.), gradually extended its trade over the whole area from Sicily to the Levant. Probably about the twelfth century B.C., when this power had weakened, the Phoenicians of Tyre entered the Mediterranean field of commerce. They extended their trading settlements to the Strait of Gibraltar and beyond it. They are said to have circumnavigated Africa. They kept the more distant sources of their wealth secret from other Mediterranean trading peoples, but it may be that extension of Atlantic sea-commerce was kept back for centuries by the decline of the Phoenician sea power. Phoenician colonies remained strong after their power had weakened in its original home, and one of these, Carthage in North Africa (on the present Gulf of Tunis), came into conflict with the empire-building Romans and by them was destroyed in 146 B.C. At this period Corinth and Athens, great Grecian trading centres, came also under Roman rule. In spite of such changes Mediterranean sea-traffic continued on much the same lines as before. But the Romans had their vast land empire to maintain and extend. Their strength was in the first instance military, not naval; they paid much attention to the development of land routes, and laid out a great system of roads. Britain was the limit of their expansion over Atlantic waters.

'But during the centuries which covered and followed the break-

[1] *Commercial Geography of the World*, before cited.

up of the Roman Empire, with their succession of wars in Western Europe, the pursuit of commerce was, broadly speaking, safer by water than on land. We now find strong towns building up trade for themselves, or banding themselves together to do so. Thus Venice, when Italy was subject to invasion from the north, was established on the safe lagoon islands at the head of the Adriatic, and extended her power and commerce over the Eastern Mediterranean and beyond, between the ninth and sixteenth centuries. Similarly, the confederation of towns known as the Hanseatic League had its origin in the ports of Lubeck and Hamburg in the thirteenth century, for the protection and development of commerce. Its influence was gradually extended over cities along the North Sea coast from Amsterdam to Bergen, and in the Baltic (Riga, Visby on the island of Gotland, &c.). Moreover, illustrating the importance of rivers to commerce, the league extended its connexions far up the great waterways of Central Europe, from Cologne on the Rhine to Cracow on the Vistula.

'Thus far we trace steps in the development of sea-traffic from the Eastern Mediterranean to the whole of that sea, and from it to the North Sea and the Baltic. The next step is towards the ocean itself. In the thirteenth and fourteenth centuries the mariners' compass was coming into use, and the following century saw the gradual exploration of the Atlantic. At its close the ocean was crossed to America, the Cape of Good Hope was doubled, and the seaway to India was revealed. The Mediterranean route to the East lost its importance until the cutting of the Suez Canal; traffic with the East no longer had to be carried on under the difficulties of transhipment and portage from Mediterranean to Indian waters, or to be subject to attack from Moorish and Arab pirates. In 1519–22 Magellan's expedition found the route from the Atlantic to the Pacific by Magellan Straits, and the world was circumnavigated. Thus the Atlantic became the highway to other oceans. The development of commerce overseas was

slow, and attended by frequent conflict between the leading exploring peoples, Portuguese and Spanish, French, Dutch, and British. But when the nineteenth century brought the development of the application of steam to machinery, and other inventions which worked such vast changes in industry and commerce, the geographical lines of commercial expansion overseas were already laid down.'

It may be added here that the navigation of the Indian Ocean was attempted long before that of the Atlantic ; it offered a natural line of communication, west and east, convenient to the movements of men in Asia ; and it is during most of the year a less ill-tempered ocean than the Atlantic.

It might be supposed off-hand that ' man's conquest of the air ', so called, might carry him a stage farther in independence of geographical conditions. It may come to be so, but the prescience of Mr. Rudyard Kipling in his story of a lifetime hence, *With the Night Mail*, does not allow it. Even the perfect flying machine which he forecasts follows the St. Lawrence to reach Quebec (' it is astonishing how the old waterways still pull us children of the air '). Dependence upon atmospheric conditions must always remain at least in the measure in which the most powerful steamers are affected by the conditions of the sea and weather. And meanwhile flight and route depend much more upon both seasonal and momentary circumstances of weather ; while even local movements of the air induced by relief of the land may condition the choice of a landing-place. An air station also requires the aid of land-circumstances. It must be accessible by land transport to convey supplies of fuel and oil for the aeroplane or airship, stores and other requirements. The position of a landing-place for aeroplanes is determined primarily by geographical circumstance. A surface level, smooth, and firm is required, with a radius of 800 to 1,000 yards. And lastly the choice of an air route must take account of the land-surface conditions

beneath it to the extent of making allowance, so far as possible, for a forced landing. To the extent that with craft lighter than air, using mooring towers, certain of these requirements disappear, geographical considerations (taken alone) would suggest that the future of flight lies with that type of vessel, at any rate for such immutable purposes as the conveyance of 'the night mail' in A. D. 2000, although at the moment the tendency is otherwise.

6

Geographical Environment and Political States

THE relationship between geographical influences and political conditions may be considered, firstly, from the point of view of the general physical features of a territory in respect to its suitability or otherwise as the seat of an independent state, and to the effects of its natural characteristics upon the measure of the political power and stability of its inhabitants. Secondly, the geographical problems specially associated with frontiers must be passed in review.

It is clear that its geographical environment must affect a people as much in its political as its social conditions—on broad grounds, indeed, more obviously so. We can draw from Europe examples of the main physical features—plains, river-basins, coasts, peninsulas, highlands, mountain systems—all exercising their several political influences. The vast eastern plain of Europe, with free communications in all directions, was at the mercy of any people strong enough to exercise political dominion, and thus came under Russian control; only since that control has been weakened at the centre have marginal peoples, who had been submerged politically—in some instances almost socially—reappeared as achieving or at least aiming at independence: such are the Finns of Finland, the Ests of Esthonia, the Letts of Latvia, the Lithuanians, the Poles, the Little Russians of the Ukraine, and others. So too Prussia, in the northern plain, extended her sway as the dominant partner in the German confederation up the valleys of the central highlands to the south, in which, more isolated as they were by the intervening hills, a large

number of smaller states had established themselves, though in blood all closely related. So the Austro-Hungarian empire established itself over the very diverse inhabitants of the plain of the central Danube and its fringing mountains, including within its frontiers Teutons, Magyars, Chekhs, Slovaks, Rumanians, Croats, Serbs, and Slovenes. Since the break-up of the empire, German Austria and Magyar Hungary have been relegated within boundaries which inevitably leave outside many of their kin; Chekhs and Slovaks united to form the republic of Chekho-Slovakia; Rumania pushed from her own lower plain of the Danube across her old frontier of the Transylvanian mountains, to reunite to herself those of her people who live in the central plain; Serbs, Croats, and Slovenes joined to form the new state, Yugo-Slavia, which takes name from their common race, the southern Slavs. The central plain has played its part, at least for the time being, as an influence toward political unity, for the dominating peoples have lost power to make use of that influence.

The powerful political influence of a river-basin is exemplified in France, where the Seine basin, with Paris as its centre, is peculiarly equipped as the nucleus of a great state—a nucleus clearly defined by its limiting uplands, yet radiating easy routes in every landward direction within the limits defined by the Pyrenees, the Alps, and the eastern frontier; opening upon a thronged seaway in the English Channel, and defensible, as has been proved, by resolute peoples. Another instance is Poland, which in a geographical sense should be the basin of the Vistula, but the limiting watershed of this basin to east and west is so far weakly defined that, for this and other reasons, to which we must refer later, considerations not based upon topographical features must control the fixing of the frontiers.

As an instance of coast-influence, Norway is the obvious example: her people, impelled to a seafaring life by the sheltered waters of her long seaboard, fringed with protecting islands and

penetrated by quiet fiords, form a family apart from their relatives the Swedes on the other side of the Scandinavian peninsula, from whom they are separated by the high backbone of the peninsula, for the most part a bleak upland little fitted for habitation. The Greeks afford another case: from their mountainous peninsula, again offering many natural harbours, they look naturally seaward, and so they have long been the leading sea-traders in eastern Mediterranean waters, and have lately extended their political territory around the northern coast of the Aegean Sea, and across it to Asia Minor.

The importance of the sea as a trade-highway urges any nation with the slightest opportunity of doing so to stake a claim upon the coast, and thus we find the Baltic and north-western coasts of Europe bordered successively by Swedes, Finns, Russians, Ests, Letts, Lithuanians, Germans, Poles on the pathetic scrap of shore allotted to them, Danes, Dutch, Flemings and Walloons, French and Bretons. Under certain conditions not only the seaway along a coast, but also the coast itself may become a line of communication, as exemplified by the broken lowland along the north shore of the Aegean, where the mountainous interior prevents easy communication east and west as well as north and south. Along this strip there is a marked mixture of peoples: Greeks, Turks, Bulgars, Serbs, and others jostle; to assign this territory to Greece is perhaps to make the best of a difficult business, but the land is not one where there can be any cogent argument for self-determination or in favour of any one nationality as such. A somewhat similar case appears in the diversely populated territory of the Dobruja bordering the Black Sea, and dominated by Rumania, which therein numbers subjects of Bulgar, Turkish, Russian, and even German origin.

The peninsula as a political unit needs no explanation: we have only to look at Greece, Italy, or Denmark for an example; but at the same time to recollect that the peninsula as such has

no very powerful influence towards political unity, and its own internal physical conditions may make for disunity. They helped to do this in ancient Greece, a land cut up by high hills and deep valleys into little physical units, and so into little political units, in earlier history; Italy was not always united; Spain and Portugal have, at least in part, a marked geographical separation in a line along the core of the peninsula, across which communications east and west are by no means easy; the natural division between Norway and Sweden has been noticed already. For the rest, a peninsular state has a debatable frontier only along the one side where it joins the main continental mass; that is in a measure advantageous, but it is to be noted that such frontiers have been duly debated, since the great war, in the case of Greece, Italy, and Denmark.

There are in Europe, apart from certain little communities nominally independent, like Andorra or San Marino, two states which illustrate the interaction of mountain environment with political conditions in a remarkable way. We have already cited them as examples in Chap. 2, and may now carry the comparison a little farther. The one is Albania, where a very ancient people is preserved in independence by the extreme difficulty of access to its territory from without. The Albanians have remained divided among themselves in respect of clan-sentiment and religion; one valley, it might almost be said, against the next. The intervening steep mountain ridge prohibits mutual intercourse and understanding, and no great pressure from without has been able to unite the opposed clans within for common action against it.

The other mountain state is Switzerland, which, we found, 'was only driven to form itself into a political unit by the external influence of fear lest the strong Powers surrounding its territory should encroach upon it.' 'Switzerland', says H. B. George,[1] 'is, from almost every point of view, more anomalous than any

[1] *The Relations of Geography and History*, chap. xv.

other state now subsisting. . . . It has no language, no race of its own. . . . The confederation began through small communities of peasants, dwelling in the mountain region round the lake of Lucerne, combining to resist the oppression of the Hapsburgs. . . . The original cantons were all situated in the region drained by the Aar and its affluents into the Rhine below the lake of Constance, and the confederation was altogether German. A similar but much smaller league, or rather cluster of tiny leagues, formed itself in the upper valley of the Rhine itself, including all the districts in which Romansch is spoken. This remained for centuries in close alliance with the Swiss confederation, and ultimately was formally united to it as canton Granbünden. The extension into French-speaking regions was begun by canton Berne making conquests on its own account; and Uri similarly conquered the Italian district south of the St. Gothard pass. Finally, as part of the re-settlement of Europe after the wars of the French Revolution, the Swiss confederation was placed on its present footing. . . . Switzerland, having thus formed itself in defiance of geographical principles, was recognized by collective Europe as a valuable member of the body politic.' Yet the principles which we have discussed in our consideration of geographical environment do not seem to have been very seriously defied. Under the influence of mountain environment a number of little communities are formed, both in Switzerland and in Albania. The environmental influence by itself can do no more, so that in Albania, averse and protected by its very environment from external influences, the little communities do not confederate into a big community. In Switzerland those external influences are present, and confederation takes place. But the influence of mountain environment is maintained over the confederation as over its members. What geographical anomaly is here?

The natural frontiers which are obviously associated with political boundaries are seas, deserts, mountains, and rivers, with

marshes and lakes. The obvious ideas which are associated with the definition of boundary lines may be strategic, economic, or ethnical; or in other words, considerations of defence, commerce, or nationality. The primitive conception of a frontier would emerge from a realization by the primitive hunter of the extreme range of territory which he covered in the search for food: his limits might be natural obstacles, or they might be found in areas where he began to encounter rivals; in either case they were represented by zones rather than lines. Civilized peoples sometimes preserve the formal frontier zone, in which fortification, or any provision for economic protection, is taboo; there is one such zone along the southern part of the Norwegian–Swedish boundary; another between Spain and British Gibraltar. But civilized peoples must needs also lay down boundary lines upon the ground, and plot them on maps, and nature does not do this for them. Nature does not draw boundary lines. She occasionally draws a fairly sharp line, as between desert and non-desert country, between forest and grass-land; she comes nearest to providing nations with ready-made boundaries where she has laid down coast-lines, shore-lines, and rivers; but broadly speaking all natural frontiers—even rivers—are more or less zonal in character.

The value of the sea as a frontier needs no demonstration: we should realize it if any people can; ours, even in the great war, was violated (whether from the water or from the air) in a measure which in comparison with the major results of the strife was extraordinarily trivial, though this may not always be so. The desert, unfitted for settled habitation, also provides an obvious frontier zone, and though Europe as a whole is wanting in this particular land-form, we can go near to illustrating it in the barely inhabited, physically featureless zone which separates European from Asiatic peoples between the Caspian Sea and the Ural Hills.

The Ural river, in that area, is sometimes regarded conventionally as the boundary between Europe and Asia, though it is noteworthy that it was not used as an administrative one under the Russian empire, any more than the indeterminate line of the southern Ural Mountains was, though we use these also as conveniently dividing the continents. Boundaries between federated states, where frontier 'incidents' are not to be apprehended, may quite commonly be laid down along rivers for convenience, just as, where there is little or no reason for aggression on either side, territories may be demarcated by mathematical lines as in America, Africa, and Australia. But this last type of boundary, unless for very short sections, would be impossible under European conditions, and the propriety of using even rivers as boundaries under such conditions has been keenly argued, the balance of opinion being probably against it.

The leading objection to the use of the river as a political frontier is found in the view that the river valley, unless it be a gorge or otherwise obstructed, is a natural line of communication and often forms a specially fertile and populous zone, and it is argued that a boundary line ought not to cut lengthways through such a zone, at any rate so far as to divide it between two independent powers. This argument brings up incidentally the whole question of the view of a frontier as a defensive zone. If defence were the main object of the frontier, it would clearly be desirable that in order to avoid, so far as possible, disturbance of civil population during war, the frontier should coincide with a region of scanty population and of small economic value. On the other hand, what may be called a pacific view of international frontiers would justify, if not actually welcome, the laying down of boundary lines through areas which are fitted by nature for intercommunication between one nationality and another. Such an area a populous river valley may very well be, and the settle-

ment of frontiers in Europe which followed the great war clearly departs from the defensive frontier as the leading idea. The justification for doing so was based partly, no doubt, upon the hope that the maintenance of peace in future would be assisted by the mechanism of the League of Nations. Further possible justification lies in the view that the methods of modern warfare have rendered defensive frontiers more or less ineffective. Those methods can, on the one hand, overcome or circumvent almost any natural obstacle. On the other hand, with the use of the trench, they can hold a line, however poorly it be fitted by nature for the purpose of defence. In theory, therefore, the use of rivers as boundaries appears to have escaped from one of the arguments principally used against it, and on the map of Europe there are now found four leading examples of important rivers used to divide independent states. These are :

1. The middle Rhine where it separates France from Germany.
2. That part of the middle course of the Danube where it separates Hungary from Chekho-Slovakia.
3. The Drave where it separates Hungary from Yugo-Slavia.
4. The lower Danube, where, as before the great war, it separates Rumania from Bulgaria.

In the first case, that of the French boundary on the Rhine, it might appear that ideas of sentiment and justice had overridden all other considerations, and it is sometimes argued that the proper geographical frontier of France in this quarter is provided by the Vosges mountains. They, like any other mountainous system, certainly offer a zone of sparse population of no very high economic importance, and a measure of opportunity for defence ; but again, the European settlement, without being carried so far as some would go who argue in principle against making a fetish of natural frontiers, has in some instances departed from the recognition of such frontiers in favour of that of other con-

siderations, and the new French frontier offers a salient example of this movement. The rehabilitation of Alsace as French territory is defensible on a dozen grounds of history, of economic consideration, of reward for French labours and sufferings; and not least of the French power to govern subordinate nationalities without friction, a faculty less conspicuous on the farther side of the Rhine. If, on the other hand, it were possible to void our minds of sentiments inspired since 1914, it might still be possible to listen to the arguments of many who, again citing historical and ethnographical justification, approved the inclusion of both banks of the middle Rhine in the German Empire. The left bank, it was urged, had always been German, racially and linguistically, no less than the right: nay, the French named l'Allemagne from a Teuton tribe settled in the disputed territory. Geography alone cannot hope to turn the scale in which it is attempted to balance these arguments. But at least it does this—it offers, on the one hand, a river-line, on the other a mountain-line, and between those it maintains in Alsace a compact territory with a defined environment and interests which it is impossible to treat otherwise than as a unit.

The Danubian boundary, which separates Chekho-Slovakia from Hungary, suggests that the line of the river is chosen very much as a matter of convenience. Many Magyars live north of the river here, and are separated from their own independent nationals, while the Slovaks are confined to the Carpathian foothills farther north: but communication east and west across these foothills is not easy, and the lowland bordering the Danube on the north affords the state of Chekho-Slovakia the natural road for such communication, very necessary in view of its peculiar elongated form. The river Drave is chosen clearly because it happens to be the ethnic frontier between Magyars and South Slavs; a rather peculiar instance, just as the course of the Drave itself is

in a measure peculiar, as roughly demarcating a line between the central Danubian plain to the north of it and the Yugo-Slav mountain system to the south. Farther east, frontier settlements have disregarded considerations physical and geographical; the boundaries of Hungary, Rumania, and Yugo-Slavia meet in the central Danubian plain, and considerations of nationality have been taken as paramount, so clearly as they can be defined in this area, which, as there are no physical conditions to prevent it, is one where different peoples mingle inextricably. It is only below the Iron Gate that the Danube maintains its position as a frontier river, except at its delta and for some distance above it; but the Danube does not stand by itself in these parts as a boundary line; it forms part of a zone which offers a physical and defensive frontier, as it is bordered on the Rumanian side by marshes difficult to cross. It thus appears that, in each of the cases of important river frontiers in Europe which we have discussed, there are entirely different sets of circumstances which have led to their adoption as boundaries.

Among European boundaries determined since the war which may be taken as examples of mountain boundaries are those of Italy on the north-east; of Chekho-Slovakia on the north and west, and of the Balkan States in greater part. The controversy over the Italian frontier with Yugo-Slavia was peculiar, inasmuch as the extreme Italian view which demanded the acquisition of practically the whole eastern sea-board of the Adriatic paid no attention, justifiable in fact, to considerations of physical conditions, defence, or economic desirability. So far, however, as regards that part of the north-eastern Adriatic sea-board which is now under Italian domination, including the great port of Trieste, it is noticeable that the effects of the seaway and communication along the coast in mingling nationalities, which have been mentioned already, come into play. The Italians are

strong in influence and in numbers along the Istrian coast; the difficulty was to determine a frontier behind that coast which should do justice to the inland non-Italian inhabitants, exactly as to the north of the Aegean the difficulty was to find a boundary which should do justice to the inland non-Greek population. In neither case was it possible to avoid placing a considerable number of inhabitants under foreign rule. The same thing happens in Chekho-Slovakia. Bohemia, which forms the western part of that republic, has a national frontier, if any country ever had, in the hills to the north and west of it which separated the German and Austro-Hungarian empires and still separate the German and Chekho-Slovakian republics; but the German nationality had surged over those hills at the expense of the Chekhs, and an international boundary, if it were capable of definition at all, would lie somewhere within their circle, a condition hardly to be contemplated from an administrative point of view. Farther east, the northern frontier of Chekho-Slovakia is found to lie along the Carpathian Mountains, which are high enough to provide a natural frontier zone of separation. But the most interesting feature in the republic of Chekho-Slovakia is its position athwart the series of important north and south routes, of which that by way of the Moravian gate between north and central Europe cuts it nearly across the middle. A state strong enough to control these routes commercially and politically, as Chekho-Slovakia now does territorially, should hold a position more powerful in relation to its neighbours than any inland state in Europe; on the other hand a weak state open to access by enemies on either hand might find itself in the position of a hunter in the hug of a bear.

With further reference to the Balkan boundaries, we need only observe here that excepting the northern lines, including, as we have seen, parts of the rivers Drave and Danube, the boundaries

run generally through mountainous country. But the whole land is mountainous; the people are mountaineers accustomed by their environment to disregard its obstacles to movement; and there are no individual ranges of such outstanding height or difficulty, continuously at least, as to offer strong natural frontier zones. We may quote the geographical commonplace that the Balkan peninsula has no natural centre physically fitted for a seat of government over the whole area; there is no basin like that of the Seine with its radiating routes; but even if there were there is no ground for supposing that geographical environment alone would reconcile the mixture of antagonistic peoples who inhabit this diseased member of Europe.

Lastly, in Poland we find the perfect example of an endeavour to define ethnic boundaries without the assistance of any marked topographical features so far as the eastern and western margins are concerned. Not that Poland is wanting in the internal geographical conditions of a strong state. The Poles themselves are in a powerful majority in a large proportion of their territory. They possess easy land-communications and fine waterways in the Vistula and its tributaries, they have good agricultural lands and forests, mineral wealth in the south along the foothills of the Carpathians, and an established manufacturing district extending from Lodz (Wudsh) to Warsaw. They would, save on political grounds, possess in Danzig the natural port at the Vistula mouth. But this city was too far Prussianized to be placed in Polish hands, and was made a free city. In a narrow strip of the rural district west of it the Poles reach the Baltic coast, and this strip was given them; but it is defenceless, and could be pinched off at once by an aggressive power. Meanwhile it was pointed out [1] directly after the settlement following the cessation of the war that 'there

[1] By Mr. J. McFarlane in his presidential address to the geographical section of the British Association, 1920.

are on the east and west no natural boundaries to prevent intrusion or to restrain the Poles from wandering far beyond the extreme limits of their State'. It is of interest to quote this statement, because it indicates precisely what the Poles started to do as soon as their chance came; under their subsequent settlement with Soviet Russia they pushed their eastern frontier farther in that direction at the expense of the White Russians, almost to the gates of Minsk, one of the few important towns in that poor and backward territory.

7

The Local Application of Environmental Study

WHEN we come to consider the details of environmental influence, as operating upon any small area of human settlement, we find that there are successive stages of investigation, varying degrees of complexity. As for the successive stages: at the bottom step of the ladder there are the simple facts of geographical position which are familiar in geographical text-books as accounting for the location of towns and villages. The ladder leads us at the top step to the minute studies which are necessary to accomplish the 'full-dress' regional survey, which, as we shall see, can only be carried out on any extended scale by the co-operation of many workers, and represents researches of which the value is not yet fully appreciated. As for the varying degrees of complexity: it may be found in any given area that there is one single physical condition, whether it be the relief of the land, or some climatic feature, or condition of the soil or other geological phenomenon, which exercises a basic control over man's settlement and activity in the area; or it may be that a whole series of these environmental conditions interact.

We may attempt a rough indication of the simple geographical causes which underly the growth of towns, with the premiss that when examples are given, the causes which they illustrate, however powerful, are to be regarded (usually) as contributory, along with others which may or may not be geographical.

Starting with seaports, we find a number of geographical considerations which may govern their position. None of these is common to all ports. A rich hinderland and a good harbour

or shelter for shipping may be regarded as the two principal requirements. A rich hinderland may wholly overcome the disadvantage of the non-existence of a good harbour. For instance the export trade in sisal hemp from Yucatan (Mexico) must have its port, though there is nothing approaching a natural harbour on the whole coast; so that the trade has concentrated at Progreso, a point conveniently near the inland capital (Merida), but where ships have to lie in an open roadstead some miles off shore and be loaded from lighters, which can reach the piers through the shallow water. In this cumbrous and comfortless fashion the natural disadvantage of the coast must be overcome until men construct the artificial harbour of which they talk. The necessities of transit traffic may operate in the same direction; Dover and others of our own cross-Channel ports are examples, where not only is natural shelter wanting, but even the approach to the shore from the uplands above may be difficult for railways.

On the other hand the existence of a good harbour cannot overcome the disadvantage of the non-existence of a rich hinderland. It is only necessary to recall the unused natural harbours of western Scotland or Norway to realize that. Bergen, in Norway, is somewhere near an exception to the rule; but it has a communication-line behind it to the interior, of which a part is fairly populous, and it is a distributing centre for the fiord-sides north and south.

It is because of the importance of a rich hinderland that the estuarine or river-mouth type of harbour is most commonly found to furnish the site of a great seaport, when the river-valley offers a natural route to the hinderland. In such cases, if big modern vessels cannot reach the original port because the estuary is too shallow for them, an 'outport' is formed on deeper water nearer the sea, as in the case of Tilbury on the Thames below London, or Cuxhaven on the Elbe below Hamburg. The

estuary port commonly needs dredging to keep it deep, and may require artificial shelter by means of a breakwater, as at Plymouth, or piers, as at the Tyne mouth. A distinction should be drawn between the estuary harbour and the drowned-valley type, more favourable by nature, of which San Francisco and New York are examples. Then there are the ports where shelter is provided by an island; and an easy illustration of the three types, island, estuary, and roadstead, is supplied from the three great Indian ports, Bombay, Calcutta, and Madras. Another simple aspect of environment is found in the case of ports which depend primarily on trade in a particular commodity; the hemp port of Progreso, already mentioned, is one; more familiar examples are Cardiff for the South Welsh coal and Galveston for the North American cotton.

Various classifications have been offered of the site-conditions which influence the origin and growth of towns: we cannot discuss them fully here, for the study is best approached on large-scale maps. In brief, we find such conditions as these—a situation where a river can readily be crossed by ford or bridge; in a navigable river; or (a particular case) where a river changes from one direction to another, and a land route continues one or other of the two; at a confluence of rivers and consequently of natural routes. London supplies a familiar and a particular case of a crossing-town, in this instance at the lowest point on the river where bridging was possible in early times; Magdeburg is often quoted as an example of the town at a change in river-direction; confluence towns need no illustration. There is a group into which considerations of relief enter; such as defensive sites, on acclivities, or guarding passes; or towns where mountain valleys debouch upon plains, or towns centrally situated in plains, upon which plain-routes converge. There are sites where considerations of climate come into account, such as health resorts (whether seaside or inland); the site of health and holiday resorts may again

be determined by the existence of pleasant sandy beaches, or fine scenery, or mineral waters.

Lastly, there is the important industrial group in which the existence of raw material for manufacture, or coal for power, or water-power, is a determining factor. It is the exception rather than the rule that a great manufacturing town should be situated at the source of the raw material. In many cases it may have been so originally; the Staffordshire Potteries, for instance, were once sufficiently supplied with local clays, but are so no longer. Once a great industry is firmly established, that aspect of environment which is represented by the existence of raw material or the source of power, or both, in the locality, may cease to operate. Both raw material and fuel may have to be transported to the works from distant localities, yet the industry remains well rooted. Modern transport in that way (as in others) overcomes the simple influences of environment. And so with water-power. The first stage is to establish the water-driven machinery at or close to the source of power, as in Sweden or some of the recently developed electro-chemical works in southern Norway, or in the town of the Fall Line in the eastern United States. But water-power can be transported too, so to say, by using it to generate electricity, which may be transmitted over long distances, as in Canada and parts of the United States and Mexico. In our own land we are concerned about the exhaustion of our resources of coal, or (more immediately) with its cost; we have water-power, though not overmuch of it, and its use would not necessarily displace our industrial centres; with plenty of coal, formerly cheap, we have not sufficiently developed our water-power, even if it could not fully meet our needs. Switzerland, Norway, Sweden, Mexico, and other such lands, where rapid rivers are plentiful and coal is not, use their water-power as it should be used.

In a country like England, where certain industries are long established in certain places, the presence of coal and its use for

power is obviously not an original influence upon the location of those industries. Sheffield manufactured cutlery and tools 'long before the uses of coal and steam were thought of'. Here 'the earliest metal-workers found ironstone near the surface. Forests were at hand for fuel. Several small streams . . . ran down narrow valleys. On the high ridges above these the primitive smelting fires could be exposed to the blast of prevailing winds. The power of the stream could be used to turn grindstones'.[1] This suggests that, in less obvious cases, these simple geographical causes of the growth of towns may be rather dangerous ideas to play with, and so they are unless the whole economic, historical, and environmental conditions are pretty carefully examined. Errors may easily be committed by assigning the origin of a town to one particular geographical cause; there are commonly more than one; it might be said, as a rule, that the more important a town, the more geographical elements there are in its importance.

We can set ourselves exercises of a simple kind by merely taking a large-scale map, putting a finger upon it with closed eyes, and attempting to assess the amount of geographical control which is visible (so to say) upon the map in the locality to which chance has guided us. As thus:

The sketch herewith (fig. 8) represents a fragment of the south-western part of the Isle of Wight. The ridge of downs in this portion of the island slopes southward rather steeply to a flat terrace extending to the sea. A main road ascends a valley from the north, crosses a well-marked pass, and runs west along the foot of the downs until, finding its continuation on the south side of them difficult because (just beyond the western limit of the map) they fall directly to the sea, it takes advantage of another pass to return to the north of them. The terrace is agricultural and pastoral, not rich, rather exposed, and sparsely populated. Along the downs-foot there is shelter from the north, and a fair

[1] *Commercial Geography of the World*, p. 95.

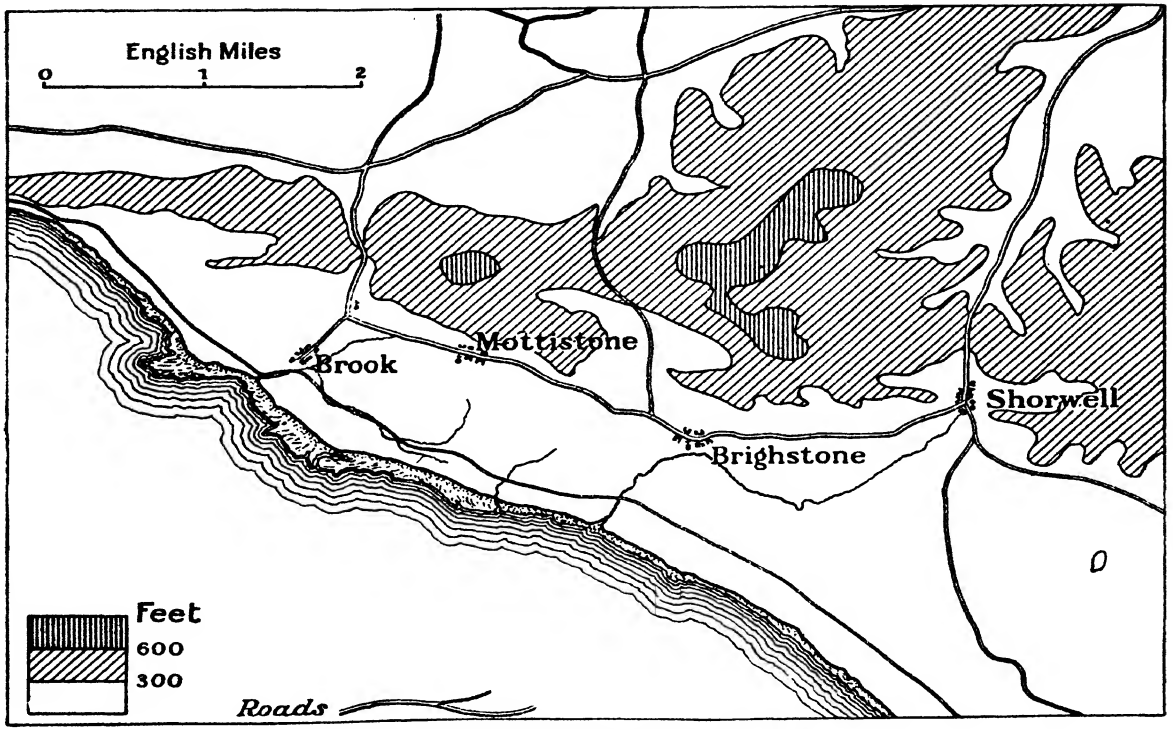

Fig. 8. A PART OF THE ISLE OF WIGHT

Based upon the Ordnance Survey Map, with the sanction of the Controller of H.M. Stationery Office

water-supply. Three villages lie here along the road, and the position of the two larger of them is obviously conditioned by the little valleys in the downs which carry two branches of the stream which is shown, and also offer passage for roads across the hills. But where the main road recrosses the downs in the west, the fourth village in the map does not stand. Its church does, for that serves a scattered population, and is at a point easy of access. But the village (Brook) is off the main road, toward the sea. For everywhere save here the terrace is cut off seaward in cliffs; but at Brook Chine a stream cuts through with an easy descent; the beach shelters a few fishing-craft, and Brook life-boat is famous along this dangerous coast. Brook village is under sea-influence, which the others are not. It has been drawn, so to say, away from the main road by the accessibility of the little chine; by only a few hundred yards, it is true, but that small distance serves to mark a change in environmental conditions as compared with those of the other villages.

Here is regional survey in rudiment; let us see how it appears in development. Professor Geddes described it (at the meeting of the British Association in 1921) as 'an enquiry into everything around us, an outlook near and far, a prying into every detail of nature and of human activities as well. It reached out'—thus he is reported—'through education into action. It was geography and all its sub-sciences of geology, meteorology, and other physical studies. It was biology too, the study of the plants and animals, and biology in relation to man. It was anthropology and archaeology, and thus psychology also. It was economics, the key of economics, for it observed all forms of human effort from the earliest occupations to the most complex of modern ones. They were out for the study of life itself. Their chief aim was civic development; their object was to make the world something better than it was before'.

Regional survey, on such a scale as is indicated by those words,

obviously requires, as we have seen, concerted and protracted effort to carry it out to the full. It is not, as a rule, effort which offers an immediate return in the sense that when it is done something good will follow for the area to which it is applied. Consequently it does not attract investigators all and sundry (which in one sense is as well). But its real value lies under the surface. A comprehensive regional survey done now would be of incalculable worth to historians of the future. It deals (if applied, let us say, to a city and its environs) with the topography, geology, soil, climate, vegetation, water-supply, and other natural features of the area; with the means of communication former and existing; with industries and trade; with the conditions of human life in all aspects, and (as regards the city itself) with its plan, administration, and amenities. (It should be added that here we again summarize Professor Geddes.)[1] And in every department of the inquiry except the first—that is to say in every department in which human activities are involved—possible future developments are taken into account; in effect, the surveyors indulge in prophecy, and their prophecies may guide, if they do not control, the work of those who come after them, in the direction, for example, of planning extensions of the city, or improving its existing conditions, or developing its industries. It is a geographical business, this, to guide and correlate the work in all the specialized departments of inquiry.

We have repeated that regional survey of this type, of which the pervading *motif* is geographical environment as we have attempted to define it, is matter for many workers in collaboration; yet an attempt may be made to illustrate a few of the points of such a survey from a specific example—a small one, as befits the compass of this book.

What may be termed the residential influence of London extends far beyond the confines of the suburbs properly so called.

[1] *Cities in Evolution*, 1915.

It embraces a number of villages and small country towns, within a radius of 40 to 50 miles from the metropolis, whose populations have been increased in modern times by residents of whom many travel to London to work. Such a place, and one of the nearest to London which retains its character of a 'country town', is Sevenoaks in Kent, 22 miles from Charing Cross by rail.

It has a situation of some topographical interest. Its ancient nucleus lies high on the ridge which borders the western part of the Weald of Kent on the north—the Ragstone Ridge, as modern geographers have seen fit to dub it. Earlier (and certainly more attractive) names, which have never come into general use, are the Quarry Hills—for they yield stone which is quarried for building and road-metal—and the Red Hills, a name given in distinction from the 'White Hills', commonly known as the North Downs, which hereabouts run parallel to and north of the red ridge, the respective crests being from 3½ to 4½ miles apart within the area of the sketch-map herewith. The western part of the intervening depression (known as Holmesdale) is watered by the little river Darent; but to the north of Sevenoaks this stream turns abruptly in that direction, and cuts the North Downs in a narrow gap (as the Medway does farther east), to join the Thames below Erith. The depression between the Downs and the ridge continues east to a low divide between small feeders of the Darent and the Medway. The structure of the district in relation to its existing drainage is interesting, but its details are too much for us here.

Sevenoaks stands where two main roads from the north converge and join. The western road is the more important, being the main road from London to Tonbridge, Tunbridge Wells, and Hastings; it crosses high over both the North Downs and the Quarry Hills. The converging (eastern) road comes from Dartford through the Darent gap. Along the foot of Quarry Hills runs an east-and-west road of some importance, connecting Maidstone

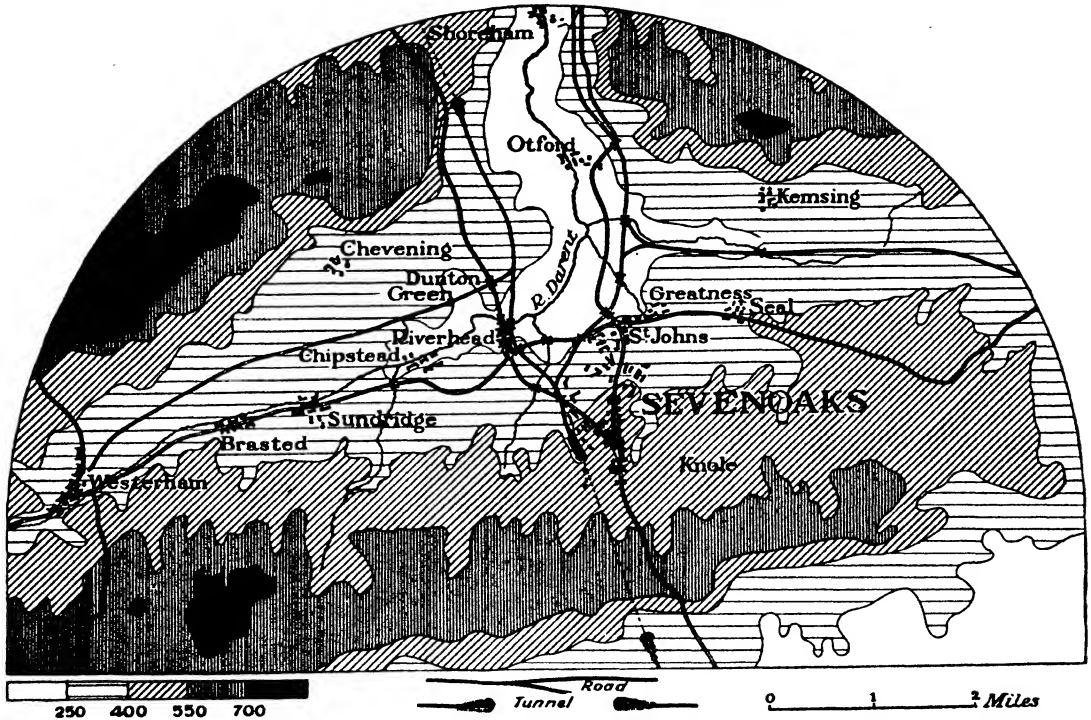

Fig. 9. A PART OF KENT

Based upon the Ordnance Survey Map, with the sanction of the Controller of H.M. Stationery Office

and East Kent with Westerham, Reigate, &c. The famous Pilgrims' Way here runs parallel to this road on the north side of the depression, along the lower slopes of the Downs; it forded the Darent at Otford, and is discontinuously marked to-day by modern by-roads.

The history of Sevenoaks, so far as our purpose is concerned, is scanty. Its position high upon the Quarry Hills—the ancient church is just above the 500-foot contour—is unusual; with very few exceptions the villages lie along either foot of the ridge. The main road from London appears to have run, at least down to the seventeenth century, not through Sevenoaks but west of it, where, curiously, it has now been proposed to construct a relief road for the heavy traffic which congests the present narrow thoroughfare. The old village seems, in fact, to have been simply an appendage of the mansion of Knole and its demesne, which adjoins the town on the east. The earliest records of Knole date from the beginning of the thirteenth century; the parish church from about 1280 in its oldest part: the village consisted perhaps of estate labourers, and in later centuries the well-wooded hills attracted wealthy residents on adjacent estates. The Darent gap and the depression to the east formed a natural line of communication which was early used, and there were defensive castles along it, as at Eynsford, Shoreham, Kemsing, and Ightham; but Knole and Sevenoaks had no relation to this system. The town must have grown slowly in importance while Knole, at first a house of no large size, passed through the hands of the Archbishops of Canterbury (about 1450) into those of the Crown, and finally, in Elizabeth's time, to an owner who greatly enlarged it. The ecclesiastical parish of Sevenoaks extended right across the ridge, and down to the lower levels on either side: it embraced St. Johns (where there was a monastic hospital of St. John the Baptist) and the relatively modern villages of Riverhead, Kippington, and Sevenoaks Weald. The church was almost precisely the geographi-

cal centre of the parish; but these outlying villages were made parishes in themselves between 1860 and 1880.

The population of Sevenoaks in 1801 was 3,441, and does not quite reach three times that figure to-day. (The population of England and Wales has increased more than fourfold in the period.) The town has grown in a curious elongated form, from the nucleus high on the hills downward toward the north, and principally along the Dartford road. Two reasons of a geographical order suggest themselves for that: the first, that the parts of St. Johns, and in particular the suburb called Greatness, have shown some small industrial developments; notably in Greatness there was a silk mill, started by refugees after the Revocation of the Edict of Nantes (1685), which flourished until the beginning of the nineteenth century. It got water-power from a feeder of the Darent. The second reason is concerned with the provision of railway communications, which was a matter not without geographical interest. The London, Chatham, and Dover Railway arrived first, in 1862, with a branch which terminated at St. Johns. This clearly contributed to the northward extension of the town, or rather to the filling of the gap between its two extremities. This railway uses the natural route of the Darent gap, and it continues east along the depression to Maidstone. The South-Eastern Railway, then an opponent of the other (the two are jointly managed now), at that time found its way out through the hills enclosing the London basin by the gap far to the west, at Redhill, where it turned a sharp curve and ran straight along the Weald through Tonbridge to the coast, as we have noticed in a previous chapter. A shorter route was desired, so the elementary dictates of geographical environment had to be overcome. A line was built direct to Tonbridge, by way of Sevenoaks, regardless of the natural obstacles of hill and valley; for it uses four tunnels (that under the Quarry Hills being close on two miles long) and one of the highest embankments in England. It reached

Sevenoaks in 1867, and the residential development of the town was assisted the more, especially in parts adjacent to the London road, which served the new station. The railway also conferred an unforeseen benefit on the town, as will presently appear.

The hills on which Sevenoaks stands consist mainly of the Hythe beds of the Lower Greensand. These beds carry plenty of water, which emerges near the base of the hills in streams or springs on either flank. They help, incidentally, to maintain the discharge of the Darent at an unusually high and steady level considering the restricted area of its basin, and small as it is it works four mills above the gap. The villages along the northern flank stand mainly on gravels where the water is readily obtainable, just as across the valley they stand at the base of the chalk; they avoid the gault of the valley itself almost entirely. Sevenoaks was supplied by wells and ponds; but when the tunnel on the new railway was being driven water was tapped in such volume as to cause serious difficulty and expense. Waterworks, however, were established above the tunnel, and the supply of the growing town was assured.

Sevenoaks is a market town for a considerable area, in which connexion the modern development of motor omnibus traffic, for which it is a centre by way of each of the main roads shown on the sketch-map, is worth remark. It is also an agricultural centre. The agriculture of the neighbourhood includes a share of the hop-growing which is more characteristic of the Weald to the south and south-east, and the fruit-growing which, beginning near by, is practised more extensively toward the east. There are no large industries. There are brickfields in the Darent valley below the town. The 'Sevenoaks stone', so called, of the Quarry Hills has been much used for road-making and building over a pretty wide area of the country. It is worth recalling that in a geological memoir compiled before coal-mines were opened in any part of Kent, the possibilities of experimental bores to the palaeozoic

rocks beneath the overlying strata were discussed, and a list of points in different parts of Kent was drawn up, where this might most readily be done; one of these points was in the lower part of Sevenoaks. Any future growth of the town would seem, however, to depend mainly on the extension of the 'residential influence' of London, and in particular upon the improvement of communications by electrifying the railways as has been proposed; such expansion might be anticipated (on geographical grounds) to take place across the Darent valley, and westward if the proposed new main road be constructed.

It is right to reiterate that these notes do not purport to represent a complete regional survey, even of the modest area with which they deal. Such a survey should be formal and methodical, which they are not; it should set out the data under a series of headings without omission, which they do not. Here, for instance, climatic tables have been omitted because the climatic factor does not bear distinctively upon man in this case, as the geological factor does; the complete survey should clearly, nevertheless, include them. But if what has been written here of one small town among hundreds should suggest possible lines of interest to any reader in his own (or any other) locality, it has served its purpose.

8

Environment and History: Conclusion

WHAT is the use of all this?

In natural history collections we are accustomed to view rows of butterflies on pins; ranks of stuffed birds mounted starkly on wooden stands. We may admire them; we may learn their names and habitats, and even commit their appearances to memory, but of their manner of life we gather nothing; they are like so many disconnected facts. Even so, at school, people used to learn disconnected topographical facts by rote (the admiration, though, was probably wanting); and perhaps they got so far as to visualize the situation of counties and countries by their colours on the map.

But in some collections we find butterflies or birds set up in the natural postures of their occupations, and surrounded by soil, rocks, foliage, or other material like those among which they are accustomed to live. Here we see them in their environment: see, it may be, how they are coloured so that their environment protects them; or in what situations they deposit their eggs; on what the caterpillar feeds; of what the bird builds its nest. Even so, in preceding chapters, an attempt has been made to suggest that man may profitably be studied in his environment. We cannot do that in a museum, but we can in our own home-places or when we travel, and from books and pictures.

The value of an understanding of geographical environment in historical study has often been preached; but this understanding is not yet by any means always acquired in practice. Of the

two passages which follow, which helps to the better view of Anglo-Saxon Britain?

'In the obscure period which followed the withdrawal of the Roman forces and administration from Britain from the close of the fourth century onward, it is unsafe to follow too closely the traditional view of the Teutonic invasions. This differentiates the Jutes in Kent and the south of Hampshire, the Saxons in Essex, Sussex, and Wessex, and the Angles elsewhere; with some probability as regards the first, but it is doubtful how far the distinction between the second and third is genuine. Be that as it may, it would appear that by the end of the fifth century eastern Britain south of the Humber was under the control of the invaders. But the surviving British population contested every step, and it was not until a century or more later that the new-comers won their way as far as the Severn westward, up to and perhaps beyond the present Scottish border northward, and across the midlands as far as what is now Cheshire. The West Saxons took still longer to push far along the south-western peninsula towards Cornwall. The conquered area was divided into separate kingdoms. North of the Humber, Bernicia and Deira were ultimately joined as Northumbria. In the western midlands was Mercia; on the east coast were East Anglia and Essex, while the east midlands and what is now north Lincolnshire seem to have varied in their allegiance. In the south midlands was the kingdom of the Hwicce, and in the south of England those of Kent, Sussex, and Wessex. The whole of these as far north as the Humber emerge into history under one over-king, Ethelbert of Kent, and the relative importance of the different kingdoms varied from time to time. The conversion of England to Christianity (597–686), however, fostered the spirit of toleration between one state and another, and on the part of

the Saxon conqueror towards the Celtic peoples with whom they remained at enmity in the west and north.'

Or this:

'The Teutonic immigration was largely governed by the geographical conditions. The first lodgement was made by the Jutes in Kent, the portion of the island nearest to the Continent. Successive swarms followed, of Saxons along the south coast, of Angles on the east coast northwards from the Thames: and geographical conditions may almost be said to have determined the fate of them all. Sussex, the earliest Saxon kingdom, being separated from Kent by Romney marsh, and shut in on the north by the vast forest of the Andredesweald, never included more than a strip of sea-coast. Its isolation is typified by the fact that heathenism is said to have survived in Sussex when extinct everywhere else. The Angles of Norfolk and Suffolk, coalescing into one kingdom, were cut off from any advance westwards by the deep inlet of the fens, though they were open southwards to the little Saxon kingdom of Essex, which they ultimately absorbed. The West Saxons, beginning their inroad by Southampton Water, slowly spread northwards and westwards. On them devolved the largest share of the fighting against the Britons, whom they gradually drove across the Severn into Wales, or down into the hilly country of the south-west, then known as West Wales. On the northern section of the east coast the Angles had an easier task in taking possession of the whole strip of country between the Pennine Hills and the sea, from the Humber on the south to the Forth on the north, ultimately forming a single kingdom of Northumbria. Finally more Angles, landing in Lincolnshire, or making their way up the rivers which flow into the Wash and up the southern tributaries of the Humber, gradually occupied the centre of the island. Here again it was a geographical obstacle, the existence of the great forests then clothing much of the

country, that long delayed the establishment of the single kingdom of Mercia. This latest formed of the so-called Heptarchy ultimately extended itself to very nearly the present frontier of Wales. . . .

'From the open country [the Angles and Saxons] expelled their predecessors more or less completely. . . . All the south-eastern section of the island was peopled substantially by Angles and Saxons; all the western hill country remained exclusively Celtic. And the evidence seems to show that in Somerset and in the Severn basin, the borderlands to the districts of Welsh independence, there was a considerable mixture of population, the Saxons having conquered, but not exterminated or driven out, the prior inhabitants. This, it has been said, was because conversion to Christianity rendered them less ferocious; but it was obviously likely to happen for geographical reasons.'

Disregarding the slight differences of judgement and fact as between these two versions, and considering that the second does not purport to be even a summary history, but is merely illustrating the power of geographical factors,[1] we can feel no doubt as to which supplies the clearer picture of England during the building of the Heptarchy. The first is in a sense a geographical statement in so far as it needs a map for its elucidation as (and more than) the other does. But the first is a skeleton, the other clothes the bones: it takes note of environment. In history without geographical environment the figures of men are as if thrown in silhouette upon a white sheet: they are shadow-pictures, no more. Seek the geographical environment, and you will endow your figures with life and your picture with colour.

The study of geographical environment is valuable, then, retrospectively as applied to history; presently as applied to

[1] It is quoted from H. B. George's *Relations of Geography and History*, Oxford, 1901.

existing conditions, and even prospectively as applied to the future: this last has been suggested more than once in preceding chapters. It is not the whole object of geography, nor even the first of its objects, which (if you trace them back) is to survey the world, map it, and describe it. But the study of environment follows naturally upon these processes, and co-ordinates their results. And to those who do not practise them it furnishes an equipment which is useful in many branches of learning and occupation. This equipment is the geographical outlook.

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